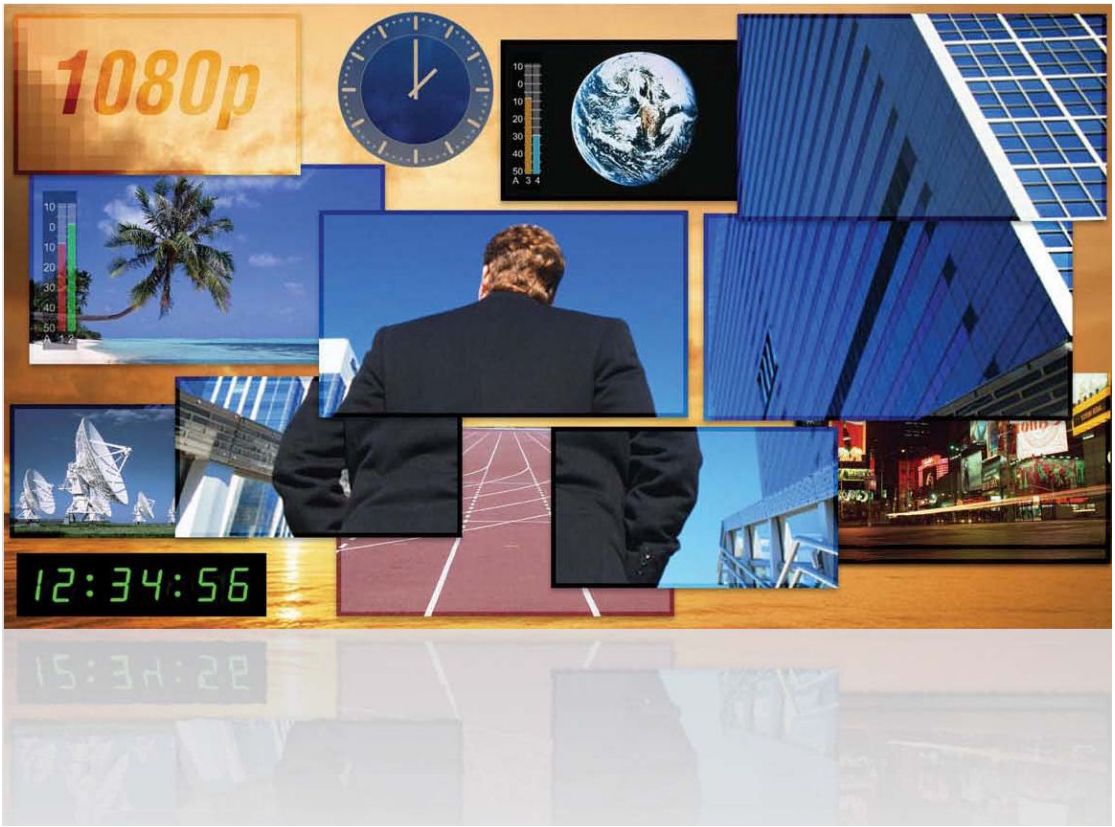
Innovation in the
Multi-Screen World

MV-16 MULTIVIEWER



USER INSTRUCTION MANUAL

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Format

This Owner's Manual describes the design and operation of the MV-Series from Snell. It is intended and written for operators of the MV-16.

Structure

This Manual is divided into the following sections/chapters:

- **Preliminary Pages**
  Explains the structure of the manual itself (this list) and provides general information about Copyright and Trademarks. Tables of Contents and Figures are also provided in this section of the manual.
- **Introduction**
  An overview of the features of the MV-16.
- **Operation**
  The operational modes and the web interface of the MV-16.
- **Installation**
  The hardware setup and configuration of the MV-16.
- **Uploading graphics files**
  Uploading of the graphics files used with the MV-16.
- **Upgrading firmware**
  How to upgrade the firmware.
- **Technical Appendix**
  Tabular overviews of the technical details of the MV-16, its components and of their interfaces.
- **Troubleshooting**
  How to troubleshoot the MV-16 if it does not operate correctly.

Numbering

Chapters, pages and figures are numbered as follows:

- Chapters are outline numbered,
  e. g. **2.2.3 Using Bitmaps**
- Pages are numbered sequentially by chapter,
  e. g. *Page vii* or *Page 2-1*,
- Figures are also numbered sequentially by chapter,
  e. g. *Figure 5-4: figure title*

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1. Introduction

The compact MV-16 multi-viewer enables up to 16 channels of video to be viewed on a single display device. The inputs are auto-sensing composite, SDI, HD-SDI inputs. In addition there are two DVI-I video inputs. Up to 3G 1080p is supported.

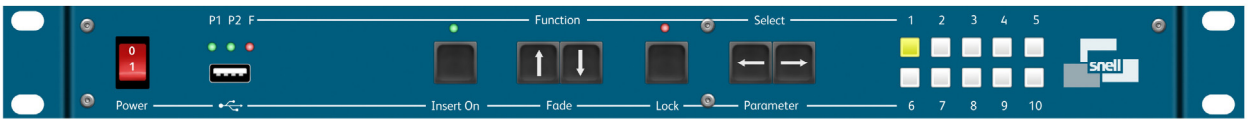

Figure 1-1: The MV-16 Multi-Viewer Front Panel

The MV-16 is designed to optimize monitoring flexibility within the multi-channel video environment, whether used for video production, television broadcast or CCTV. It is supplied as a 1U rack mounting frame with an optional remote control panel. It is easily controlled from a PC web browser hosted by the frame itself, either directly via an Ethernet cable or over a network.

1.1. System concept

The modular architecture is designed for scalability. Each video input card handles four channels. Up to four cards may be fitted to the frame, providing a total of 16 inputs. Additionally, if external audio functionality is required, audio input or output cards may be fitted. The diagram below shows the overall concept.

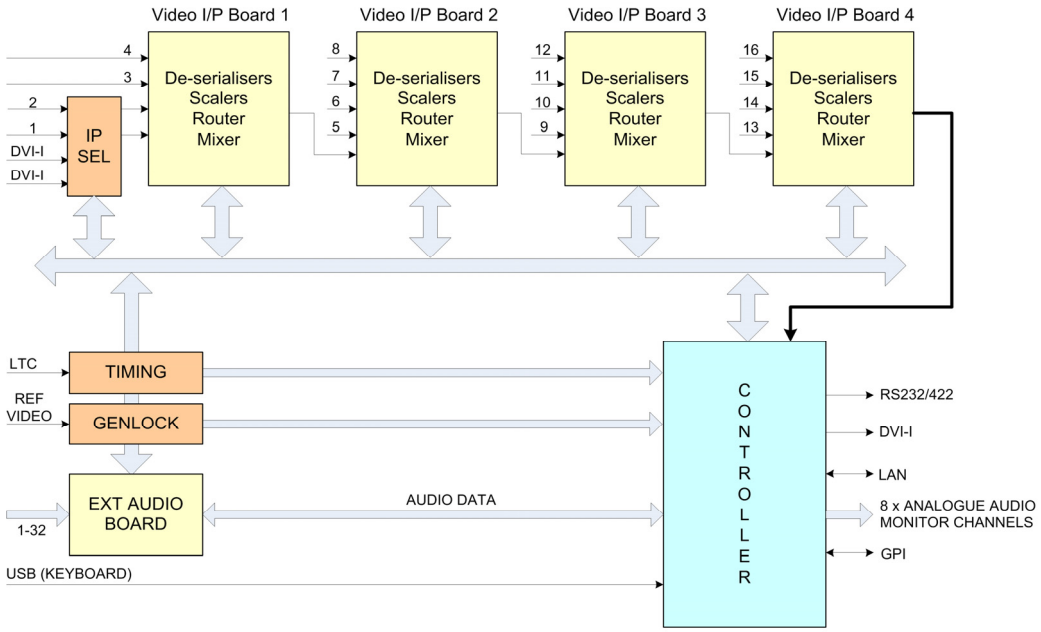

Figure 1-2: The MV-16 System Concept

A scaler on each video card processes one of the possible inputs (CVBS, SDI/HD-SDI, DVI) and scales it to the desired tile size for the selected position on the output. A mixer on each video card combines all the video tiles and sends the resulting image to the next video card. The final display output comprises all of the tiles in a single picture.

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Possible inputs are:

- **Card MV-VIP1** – Composite, S-video, RGB, YUV, SDI, DVI-I
- **Card MV-VIP2** – Composite, S-video, RGB, YUV, SDI, HD-SDI, 3G-SDI, DVI-I

Overlay of audio and graphics information is performed inside each scaler, which receives control data from the main CPU in real-time for analog/AES/EBU/ channels, or from the video card itself in the case of embedded SDI/HD-SDI audio.

To allow arbitrary layering of sources, each input board has information about all of the tile positions, allowing each tile to be displayed as required and enabling picture overlay with complex borders.

DVI-I inputs replace inputs on BNC 1 and 2. If DVI-I input 1 is enabled, any SDI input on BNC 1 is replaced by the DVI-I input. Similarly, DVD-I input 2 will replace any SDI input on BNC 2.

If composite inputs are used on BNC 1 and 2, they may be routed inside the first video card to channels 3 and/or 4.

1.2. Features and benefits

- Up to 16 auto-sensing monitored composite, SDI, HD-SDI S-Video, RGB and YUV inputs and two DVI-I video inputs (up to 3G 1080p)
- DVI-I output up to 1080p60 (1920x1080) in 16:9
- Genlocked inputs for flicker-free and full frame operation
- Teletext (analog), subtitles, AFD, WSS, VITC (SDI/HD-SDI only) decoding & monitoring
- Up to 256 channels of embedded audio may be displayed as industry standard bar-graphs with a choice of scales/ballistics
- Up to 32 channels of external audio, analog or digital (AES/EBU with SRC) may be displayed, using the appropriate the optional input card
- Support for additional external audio inputs analog, AES/EBU and Dolby Digital ® is possible, using the Snell MV-Audio (e.g. if the MV-16 frame is full)
- 4 pairs of assignable analog audio monitor outputs
- Outputs for up to 32 channels of demuxed audio; analogue or AES/EBU
- Alarms for video, audio and metadata, with outputs to GPI O/Ps, LAN and/or SNMP traps
- Assignable tallies
- Under Monitor Displays (UMD) entered via keyboard, LAN or serial cable, supporting TSL and other protocols
- Clock display receiving time information via NTP network protocol or LTC
- 1 RU compact design, ideal for OB-vans and other space restricted installations
- Front panel control or optional 1U remote key panel
- User-friendly set-up via system menu/browser software
- Standard redundant power supply
- All main cards hot-swappable

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1.2.1. Powerful alarms

Alarms can be created for video sync loss, black (loss of luminance), freeze-frame, embedded audio loss, external audio loss, over level, out of phase (of chosen pairs), teletext loss, and closed caption loss.

The colors used for on-screen alarms are as follows:

- Audio Loss.....Yellow..... position (left or right) indicates channel,
- Audio Over.....Red..... position (left or right) indicates channel,
- Anti-Phase .....Cyan ..... middle alarm,
- Carrier Loss .....White ..... middle alarm.

If carrier loss occurs, only that alarm will flash, unless audio loss had already been active for the same channel.

The decoding of closed caption is available on each scaler, together with an associated alarm. Analog teletext decoding is available in the scaler.

On-screen alarm indication can be a stationary or flashing colored tile border. External alarm indication may be via the GPI I/O or the LAN/software application, e.g. NGM-164.

Optional triggering of SNMP traps for each alarm function or group are also supported.

Tiles have an optional color coded border to provide status indication, such as tally or alarms.

VITC loss is indicated by the burnt in VITC display flashing. Burnt in VITC is available from SDI sources only.

1.2.2. Captions and UMD

Captions or Under Monitor Display (UMD) information can be generated manually from a keyboard connected to a front panel USB-2 port, the MV-Remote USB-2 port, or automatically from remote sources via the LAN, using browser software operating on a remote PC, or via the RS232/422 port using TSL or other protocols. Up to two lines of UMD text can be left, centre, or right justified and may be placed anywhere in the tile.

1.2.3. Using bitmaps

There is storage capacity (about 200Mb) for bitmaps. These can be used as backgrounds, or to display station idents, etc. The bitmaps must be in bmp or png file format and can be uploaded to the frame via the LAN. Up to four bitmaps may be displayed at any one time.

1.2.4. Keeping time

Clock/date display data can be derived from several sources. There is a set priority that determines which source is used.

When there is LTC present, this becomes the exclusive reference for the clocks, regardless of how much it differs from the RTC time.

Should there be no LTC present, the frame will search the network for a NTP server in the nearby internet region (pool.ntp.org). If a server is found, the clock reference will be taken from it.

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In the absence of any external clock reference, system time is used. A battery on the CPU board ensures that time data is retained should the unit be powered down.

For each video input, there is the possibility to display both LTC and VITC.

Genlocking of the MV-16 is via SD colour black or HD tri-level sync, or may be taken from a chosen input on any input card.

1.2.5. Using GPI I/O

Assignable GPI I/O with 16 inputs and 8 outputs for external alarm indication and tally functions.

1.2.6. Bargraph scales

The following audio scales are supported:

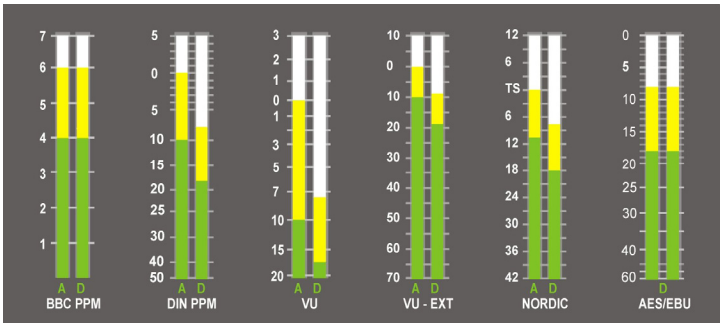

Figure 1-3: Available meter scales

Colors used for the upper and lower ranges of each bar type can be customized to satisfy any in-house monitoring style for each of the six scale types.

Each bar type can have different range colors.

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2. Operation

The front panel user interface comprises a power switch, 6 buttons for configuring the unit, 10 illuminated pre-set configuration buttons, a USB-2 interface and LED indicators for status reporting.

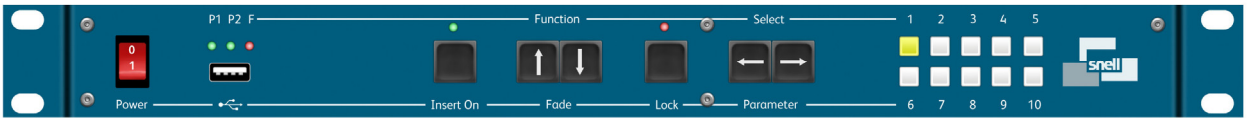

Figure 2-1: The MV-16 front panel

An optional 1U remote panel (MV-Remote) replicates the front panel of the MV-16 and is connected via LAN.

The P1 and P2 LED light green to indicate healthy power supplies. If the red F LED is lit after the unit has booted, failure of one or more ventilation fans has been detected. Under normal circumstances, the boot cycle takes about 70 seconds.

The MV-16 can be configured and controlled via the LAN, using browser software operating on a remote PC.

2.1. Local operating modes

At the front or remote panel, normal or 'locked' is the normal operating mode. A special configuration or 'menu' mode is provided to allow initial IP address configuration for LAN control via a browser. The currently set IP address will appear to the top left of the display output during the boot cycle.

2.1.1. Normal mode

In normal use, the configuration menu will be locked to prevent inadvertent operation and configuration menus are not available.

In this mode, the 10 illuminated pre-set configuration buttons are active. A currently displayed configuration can be stored by holding down the desired pre-set button for more than 3 seconds.

Stored presets are recalled by briefly pressing the desired pre-set button, which will illuminate.

Should the frame lose power, it will restore the last known configuration settings on reboot and automatically reflect these in the browser.

2.1.2. Configuration mode

To enter configuration mode from normal mode (with the red Lock LED off) hold the Lock button down for about three seconds. The configuration or 'menu' mode will be entered, an on-screen menu will appear and the red Lock LED will illuminate. If the Lock button is depressed again, any changed settings will be saved and the unit will return to normal.

The currently loaded firmware version will be indicated at the top of the on-screen menu.

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The main ‘menu’ mode controls are as follows:

- Function keys (↑ ↓) scroll the menu cursor up and down to select the desired function.
- Select Parameter keys (← →) select settings to apply to the chosen parameter.
- Lock button exits 'menu' mode and saves settings.

← →	Select submenu when menu name highlighted, or change Parameter value within menu
↑↓	Select item in menus and sub-menus
LOCK	Press Lock to save changes and exit menu mode

System configuration	Parameter(s)
Network Settings	Set Manually (using settings below) / Use DHCP
IP Address	Enter frame IP address byte at a time in the sub-menu
Netmask	Enter Subnet Mask byte at a time in the sub-menu
Gateway	If required, enter the Gateway address byte at a time in the sub menu
DNS Server 1	If required, enter the DNS server address byte at a time in the sub-menu
DNS Server 2	If required, enter the DNS server address byte at a time in the sub-menu

2.1.2.1. Network settings

These settings only need to be manually entered if DHCP is not to be used. This would be required for a network that uses fixed IP addresses and does not rely on a DHCP server to allocate them automatically.

The IP address must be unique on the network. Please see your system administrator if these details are required.

2.2. *Keyboard Operation*

Any HID compliant USB keyboard can be used for the entry and editing of UMD. The keyboard is connected to the USB port on the front panel of the MV-16, or alternatively, the MV-Remote remote control unit.

The *Tab* key activates the cursor on the topmost UMD. Successive *Tab* key operation moves the cursor on to the next UMD in sequence. The *Esc* key deactivates the cursor.

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2.3. *Using the web interface*

The MV-16 Multi-viewer is controlled via a browser using web pages hosted by the frame itself. Note that Java must first be installed on the PC or MAC that is to be used. This is available as a free download from:

http://www.java.com/en/download/manual.jsp.

To access the web interface, type the IP Address configured for the frame into a browser. The Java application should launch immediately, but be aware that Windows security precautions may block the file download.

The default IP address is 192.168.0.120.

The user interface (Figure 2-2) is displayed.

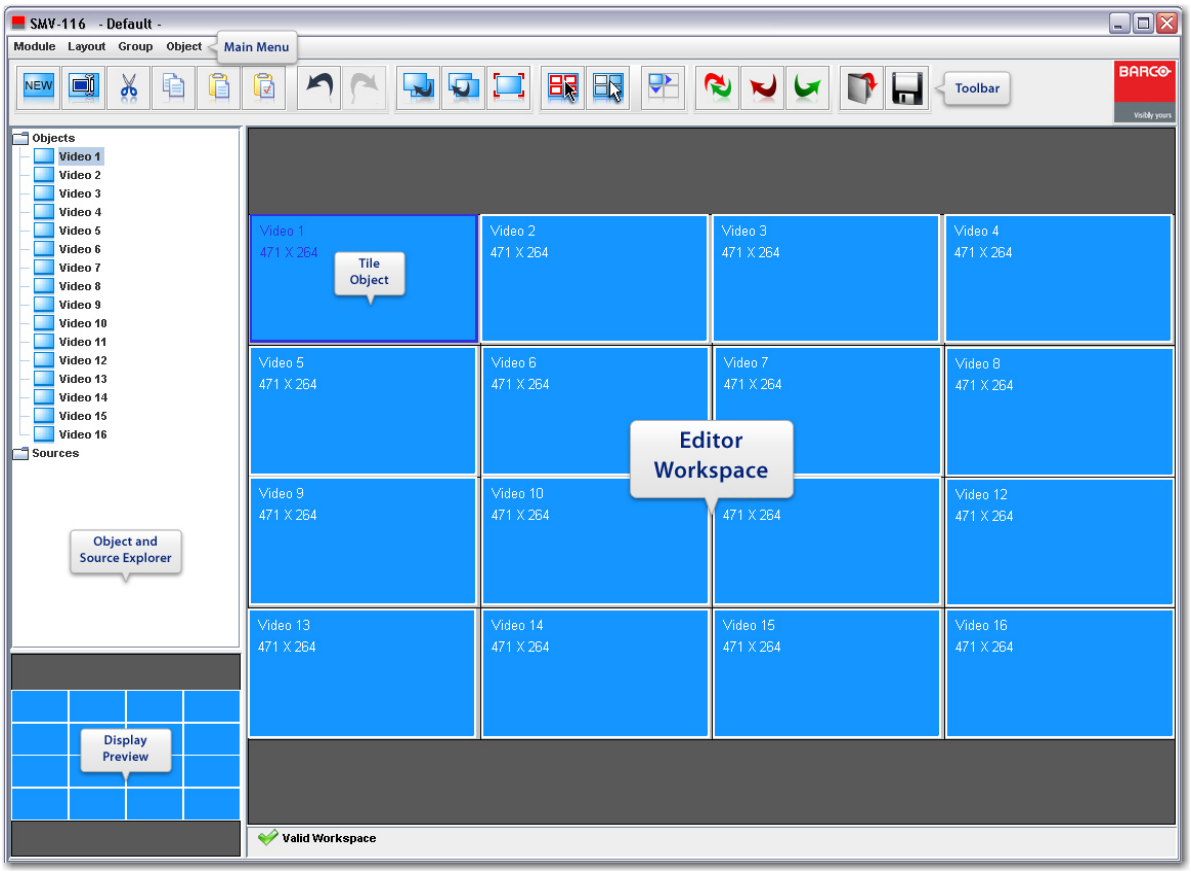

Figure 2-2: MV-16 Multi-viewer User Interface

The interface comprises three main areas:

- the **Object and Source Explorer**,
- the **Editor Workspace**, and
- the **Display Preview**.

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Tile objects can be one of six basic types:

- **None**,
- **Video**,
- **Audio**,
- **Text**,
- **Logo,** and
- **Clock**.

The color of the tile as it appears in the **Editor Workspace** and **Display Preview** indicates the currently set object type, as listed in the following table.

Object Type	Tile Color		Object Type	Tile Colour
None	Grey		Text	Brown
Video	Blue		Logo	Red
Audio	Green			

Operation is designed to be simple and intuitive. For example, object type can be selected by double clicking on a tile, selecting the **Type** tab from the **Edit Object** menu and choosing the desired tile type. Video and audio tiles can be assigned sources by double clicking on a tile, selecting the **Properties** tab from the **Edit Object** menu and selecting an available source.

Currently selected objects are highlighted with a blue border. Tiles can be moved and resized using conventional mouse operations. Tile borders may appear incomplete to indicate where they lie behind other objects.

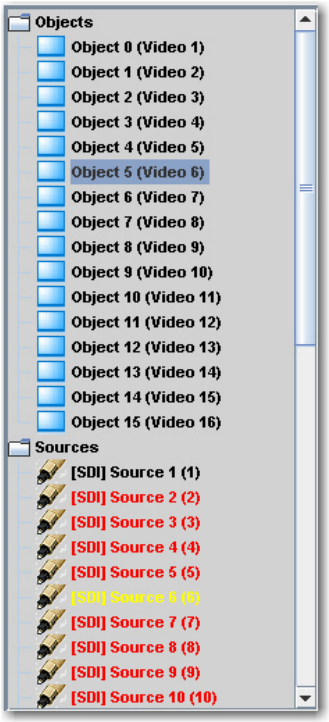

Figure 2-3: MV-16 Object and Source Explorer

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2.3.1. Object and Source Explorer

The Object and Source Explorer (Figure 2-3) displays the contents of the Objects folder and the Sources folder.

The Objects folder contains the list of current objects and each object's given name. The currently selected object is highlighted.

The Sources folder contains the list of video and audio sources, with an indication of the source type. Those sources that are currently assigned to an object appear in red, whereas those that are currently unassigned to an object appear in black. A source that is assigned to the currently selected tile / object appears in yellow.

The 'Valid Workspace' icon below the Editor Workspace confirms the validity of the configuration currently displayed in the browser. This is replaced by an error message should there be a conflicting setting. The tile with which the conflict is associated will be outlined in red.

The Edit Object menu can also be displayed for a tile by double clicking on its entry in the Object Folder in the Explorer view. Audio and Alarm settings can be configured for each source by double clicking on its entry in the Source Folder in the Explorer view.

Right-click context menus provide quick access to tile object menus and commonly used functions are presented in the top tool bar for ease of use.

The browser contains an initial 'factory default' layout. The number of tiles indicated will reflect the number of video sources supported by the current video input card configuration (e.g. sixteen tiles for four video input cards).

2.3.2. Navigating the User Interface

Settings for Multi-viewer objects can be accessed from the *Module, Layout, Group* and *Object* menus, or by using the buttons on the toolbar (Figure 2-4).

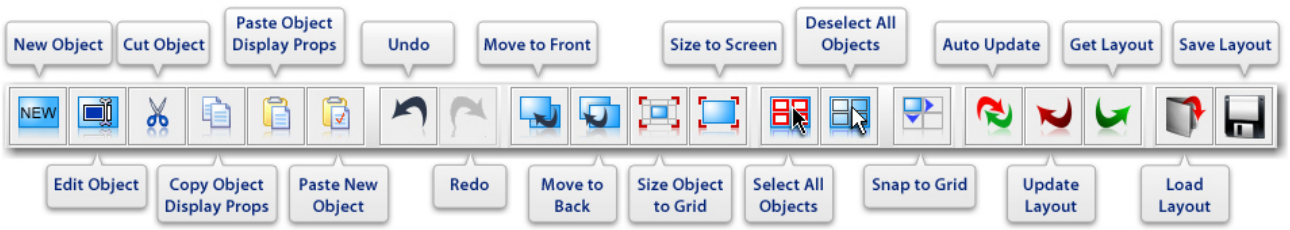

Figure 2-4: MV-16 Toolbar with Tooltips

Some functions are only available from the toolbar.

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2.3.3. Main menus

2.3.3.1. Module Menu

The Module Menu (Figure 1-1) allows a module's global settings to be configured.

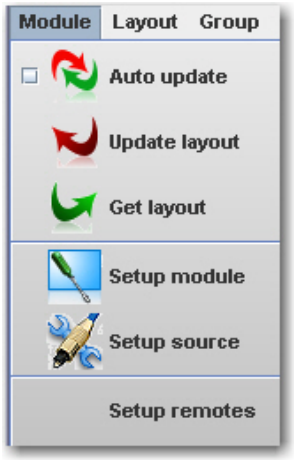

Figure 2-5: MV-16 Module Menu

Auto update	Automatically update tile layout to the display output and preview every time it is changed in the edit workspace.
Update layout	Transfer edit workspace layout to display output and preview.
Get layout	Transfer the current display layout to the edit workspace.
Setup module	Opens the **Module Properties** dialog of the currently selected tile object.
Setup source	Opens the **Source Properties** dialog of the currently selected tile object.
Setup remotes	Opens the **Remote Control Setup** dialog for MV-Remote operation.

The error message, **Selected object has no source**, will appear if the current object is not an audio or video object.

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Module Properties

Module Properties are opened from the **Module →Setup Module** menu.

The Module Properties dialog covers parameters common to the whole MV rack such as IP address and GPIs. It also covers initial setup of the inputs and outputs of the unit.

Boards Tab

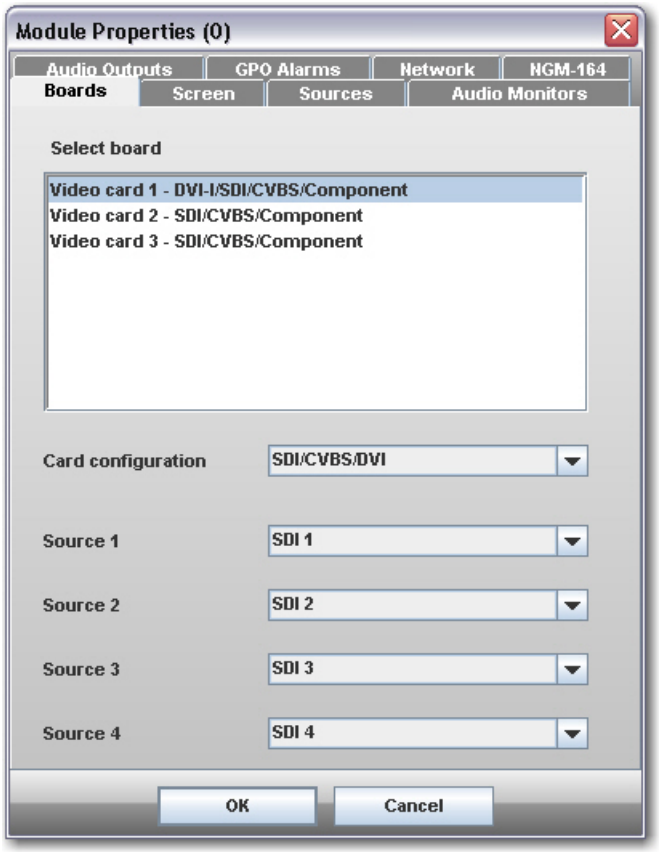

Figure 2-6: MV-16 Module Menu – Boards Tab

Select board	Select a board to define sources.
Card Configuration	Show selected card configuration.
Source 1 to 4	Select source type from drop down list for each input.

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Screen Tab

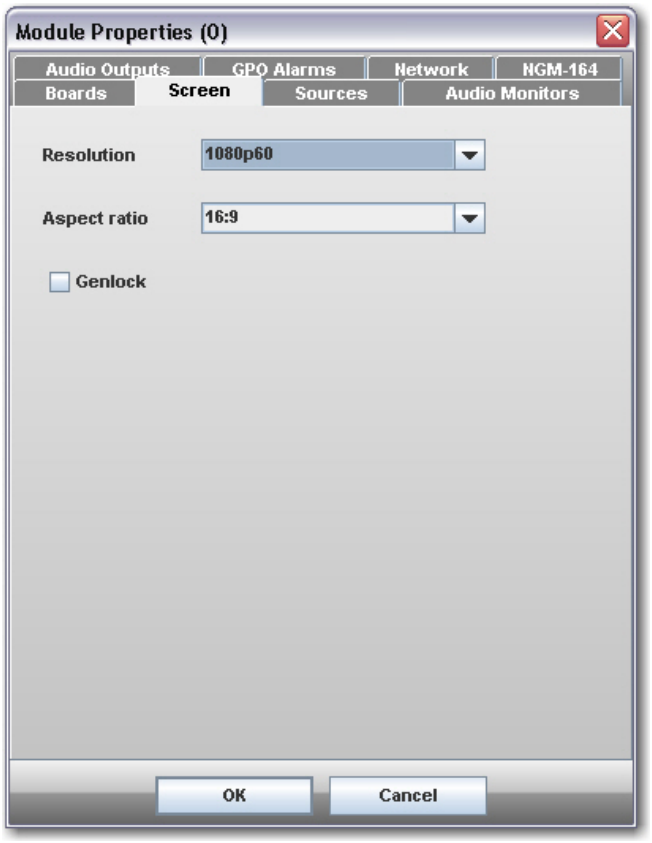

Figure 2-7: MV-16 Module Menu – Screen Tab

Resolution	Set the display output resolution.
Aspect ratio	Set the display output aspect ratio to match the display device.
Genlock	Lock the display output to the MV-16 external reference.

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Sources Tab

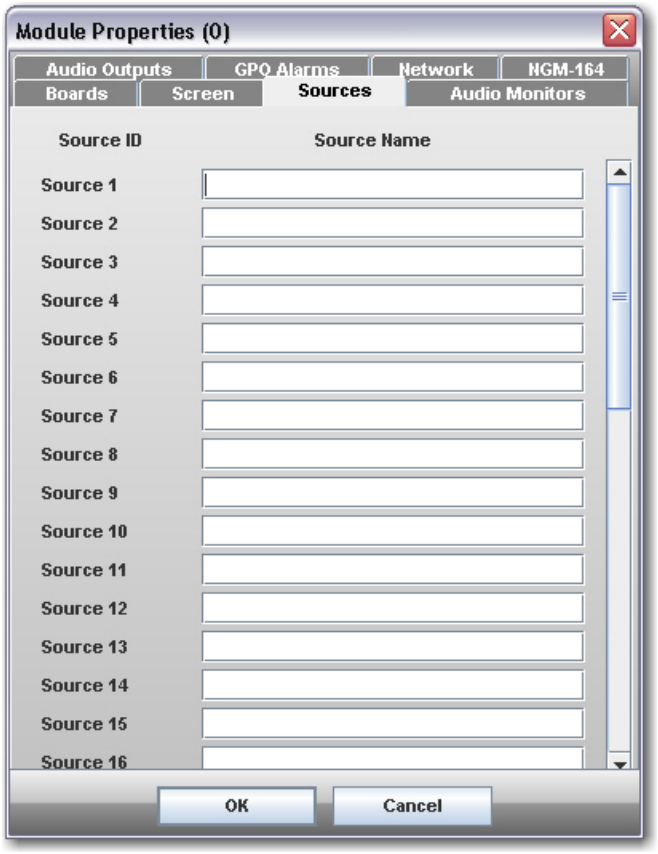

Figure 2-8: MV-16 Module Menu – Sources Tab

Source Name	Enables the naming of sources

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Audio Monitor Tab

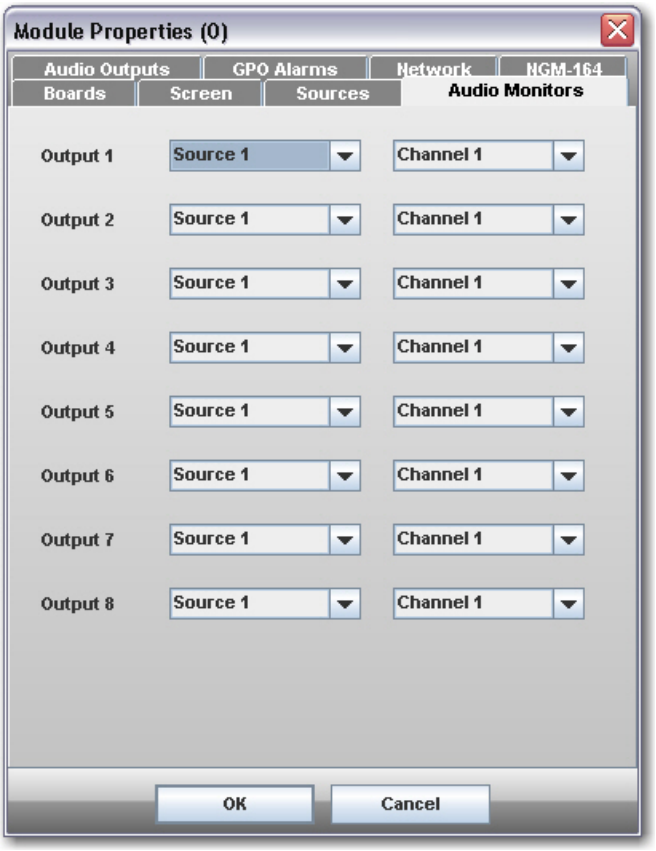

Figure 2-9: MV-16 Module Menu – Audio Monitor Tab

Output 1 to 8	Audio monitor output channel selection controls. Select the source and source channel number to be directed to the monitor output.

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Audio Outputs Tab

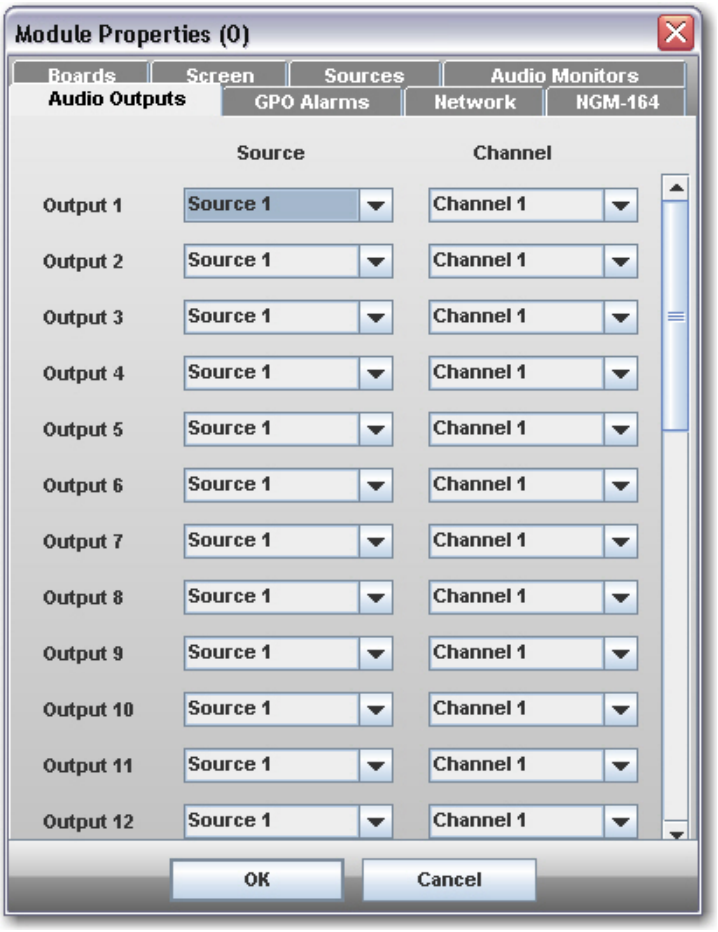

Figure 2-10: MV-16 Module Menu – Audio Outputs Tab

Output 1 to 32	Audio output channel selection controls. Select the source and source channel number to be directed to the output.

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GPO Alarms Tab

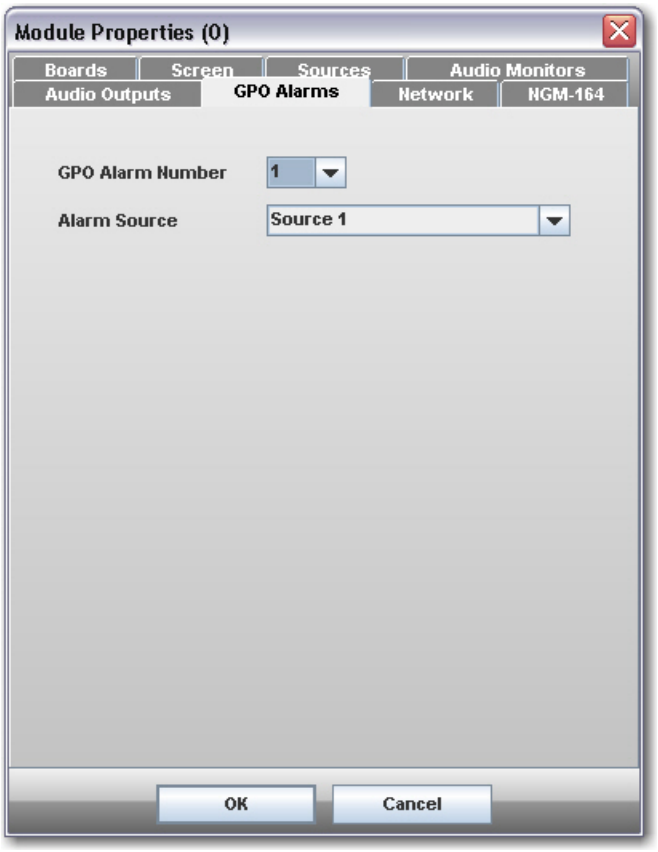

Figure 2-11: MV-16 Module Menu – GPO Alarms Tab

GPO Alarm Number	Select GPI alarm output number 1 to 8.
Alarm Source	Assign alarm source to the selected GPI alarm output number.

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Network Tab

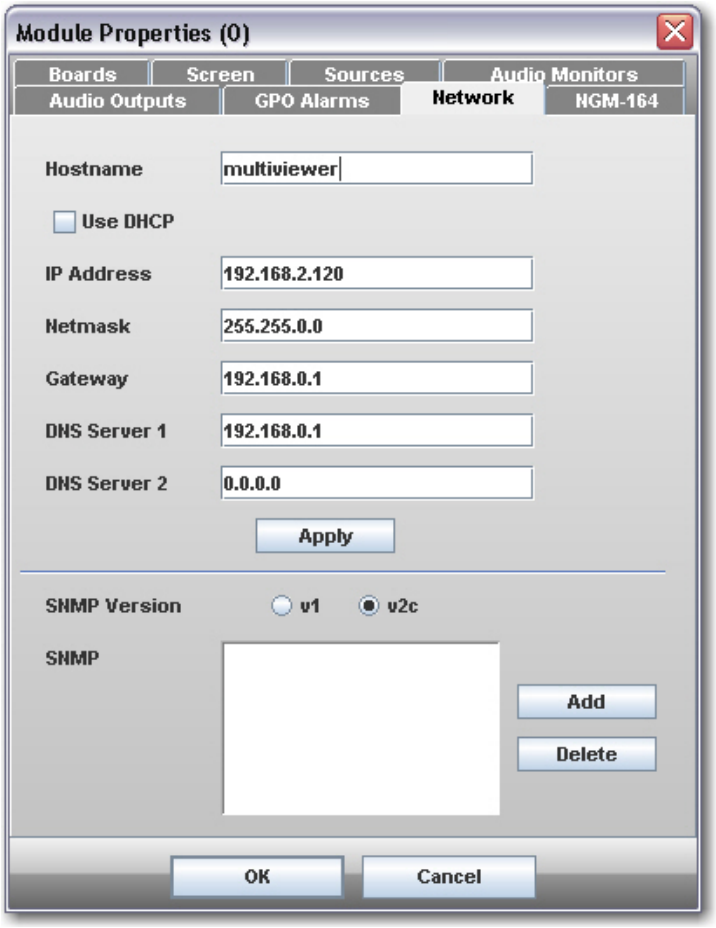

Figure 2-12: MV-16 Module Menu – Network Tab

Hostname	Enter friendly name for MV-16.
Use DHCP	Check to use DHCP for automatic acquisition of network settings. Uncheck for entry of fixed network settings.
IP Address	Enter fixed IP address.
Netmask	Enter network mask, if required.
Gateway	Enter gateway address, if required.
DNS Server 1	Enter DNS server address, if required.
DNS Server 2	Enter DNS server address, if required.
Apply	Applies fixed network settings to the frame.
SNMP	Check required SNMP version.
Add	Reveals dialogue for entering SNMP IP address and adding to list.
Delete	Deletes selected SNMP IP address from the list.

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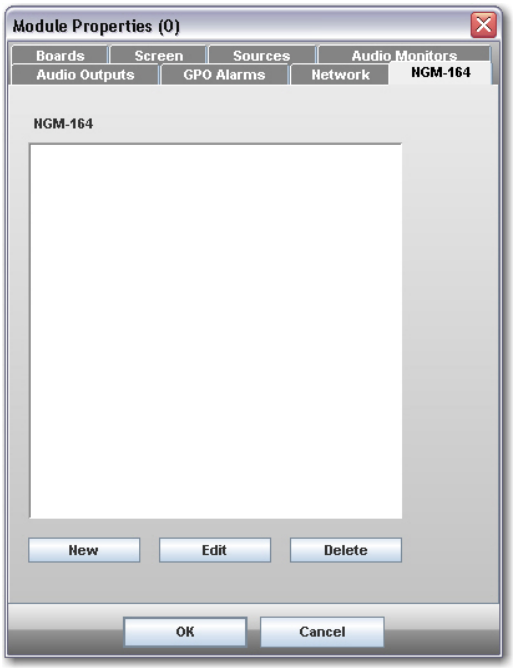

Source Properties

Source Properties for a selected tile can be opened from the **Module→Setup Source** menu, or by double-clicking on a selected source in the source folder.

Audio Tab

Use the Audio Tab to assign audio channels to sources, make global settings for phase bars and select reference levels for analogue audio and analogue scales.

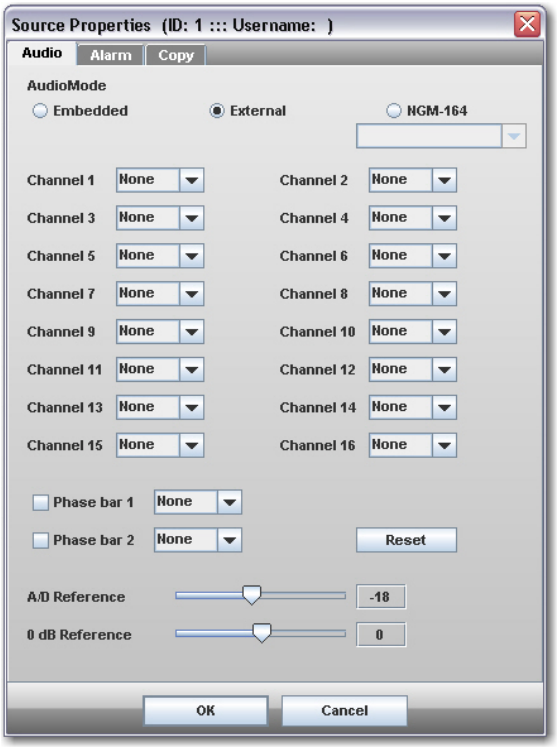

Figure 2-13: MV-16 Source Properties - Audio Tab

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Audio Mode	Selects the audio source; Embedded (from SDI video), External (from optional external audio input card), or NGM-164 (audio over LAN. A list of available servers appears in the drop-down box below).
Channel 1 to 16 Controls	Select an audio input to display for the associated source bar.
Phase Bar 1 and 2	Enable either or both phase bars and select two channels from the appropriate drop down box.
Reset Button	Press this button to reset all items in Channel/Phase bar drop-down lists to the first available item (which will be "None" in the list given by the protocol).
A/D Reference	Set the analogue to digital reference level when applying an analogue meter scale to a digital source, or a digital meter scale to an analogue source. It can be set within the range of -30 to -3 dBfs.
0 dB Reference	Set the 0dBu reference level with respect to analogue meter scales. It can be set within the range of -12 to +12 dB.

Neither the A/D nor the 0dB reference adjustments have any effect when digital audio is used with a digital scale.

Alarm Tab

The Alarm Tab allows each video and audio alarm to be configured, enabled and displayed.

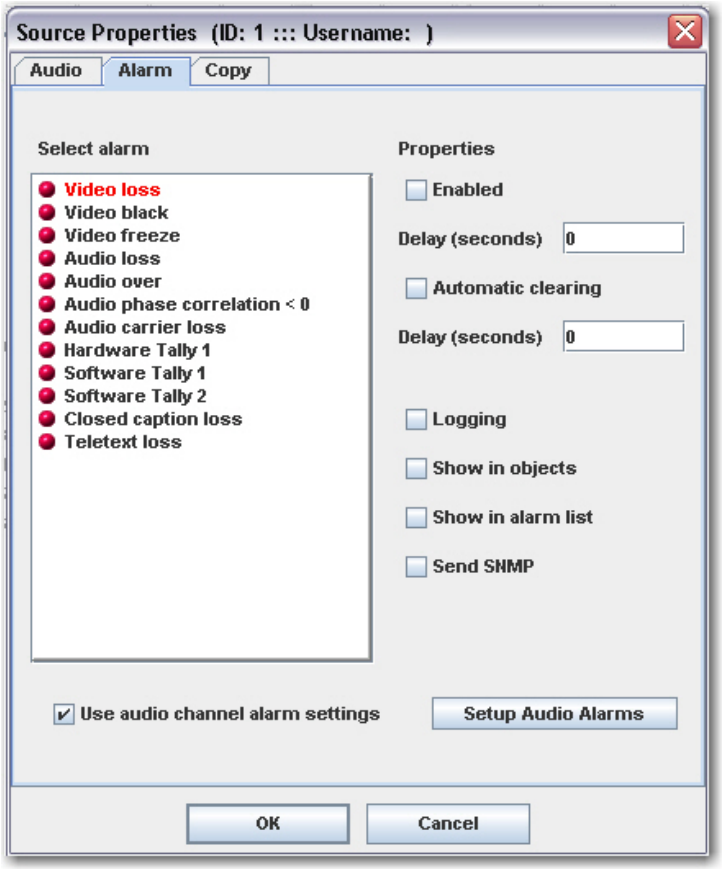

Figure 2-14: MV-16 Source Properties – Alarm Tab

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Select alarm	Click on one of the alarms listed to change the attributes of it using the controls listed under Properties.
Enabled	Tick this to enable the selected alarm.
Delay	Input a delay before the alarm starts.
Automatic clearing	Check this for alarms are cleared after the Automatic clearing delay.
Automatic clearing delay	Input the automatic clearing delay in seconds.
Logging	Maintain a log of triggered alarms.
Show in objects	Display alarms in objects.
Show in alarm list	Display alarms in the alarm list.
Send SNMP	Check to send SNMP trap in response to alarm.
Use audio channel alarm settings	check to apply specified audio alarm detection criteria, as configured in the Setup Audio Alarms menu.
Setup Audio Alarms	enters the audio alarm setup dialogue.

The properties section of this window allows each alarm to be set individually for onset and auto-clear delay, logging status and visibility in objects and lists.

To select an alarm to configure, click on it in the Select Alarm list on the left on the window. The selected alarm will appear with its descriptive text highlighted in red. Choose the required properties from the right hand section of the window and check the Enabled box to activate the alarm.

An enabled alarm is shown with a green circle before the descriptive text.

To setup audio alarms check the Use audio channel alarm settings box and click on Setup Audio Alarms.

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Audio Alarms

To setup audio alarms check the Use audio channel alarm settings box and click on Setup Audio Alarms from the **Alarm** tab of the **Source Properties** dialog.

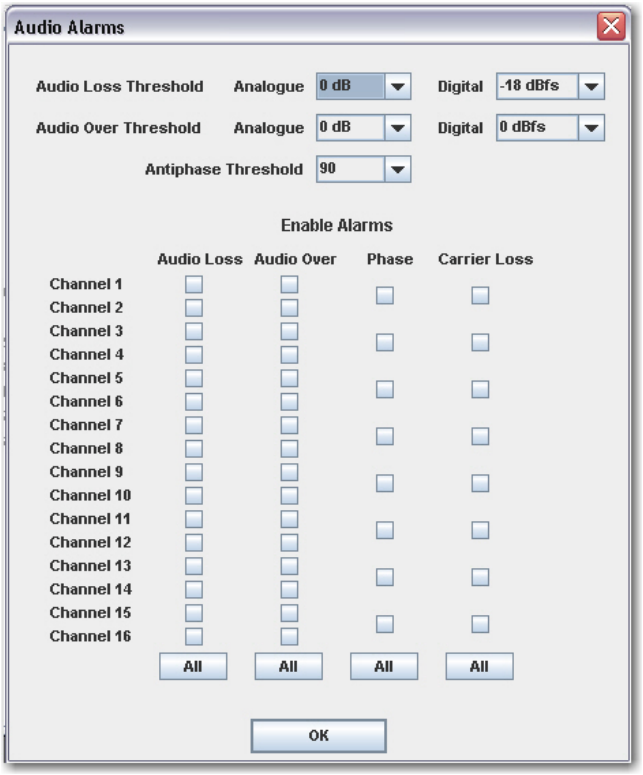

Figure 2-15: MV-16 Source Properties – Audio Alarms Tab

Check the boxes to activate individual audio alarms for channels or pairs of channels.

Select the loss and over thresholds for analog and digital sources. Choose an anti-phase threshold for channel pairs.

Select All to enable a specific alarm for all channels.

Unchecked alarms remain disabled even if Use Audio Channel Alarm Settings is checked in the Alarm tab. Nominal threshold settings apply if individual alarms are enabled but Use Audio Channel Alarm Settings is not checked.

Enable Alarms	To enable an individual audio loss or over alarm check the box in line with the audio channel. For phase or carrier loss alarms check the box in line with a pair of audio channels.
Audio Loss Threshold	The level at which audio is considered lost – select values from the analog and digital drop down boxes: The range is 0dB to -50dB for analog and -18dBfs to -70 dBfs for digital.
Audio Over Threshold	The level at which audio is considered over level - select values from the analog and digital drop down boxes. The range is 0dB to 20dB for analog and 0dBfs to -20dBfs for digital.
Antiphase Threshold	The phase values in degrees before a pair of channels is considered to be out of phase. The range is 90° to -180°.

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The effective Alarm State for individual alarms depends on the Use audio channel alarm settings box check state and the applicable audio alarm state in the Alarm tab as explained below.

If Use Audio Channel Alarm Settings is not ticked and audio loss alarm is enabled in the Alarm tab of the Source Properties dialog, then all the channels will have their audio loss alarms enabled with a nominal threshold set for the audio loss level.

If Use Audio Channel Alarm Settings is ticked and audio loss alarm is enabled in the Alarm tab of the Source Properties dialog, then the enabled state of each channel will depend on the settings in this Audio Alarms dialog, and the threshold set for the audio loss level will also be determined here.

If Use Audio Channel Alarm Settings is ticked but the audio loss alarm is disabled, then none of the audio loss alarms will be enabled.

The following table summarizes the various alarm status conditions.

Individual alarm	Use Audio Channel Alarm Settings	Alarm state
Enabled	Enabled	Enabled and uses user threshold settings
Enabled	Disabled	Enabled but uses nominal threshold settings
Disabled	Enabled	Disabled
Disabled	Disabled	Disabled

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Copy Tab

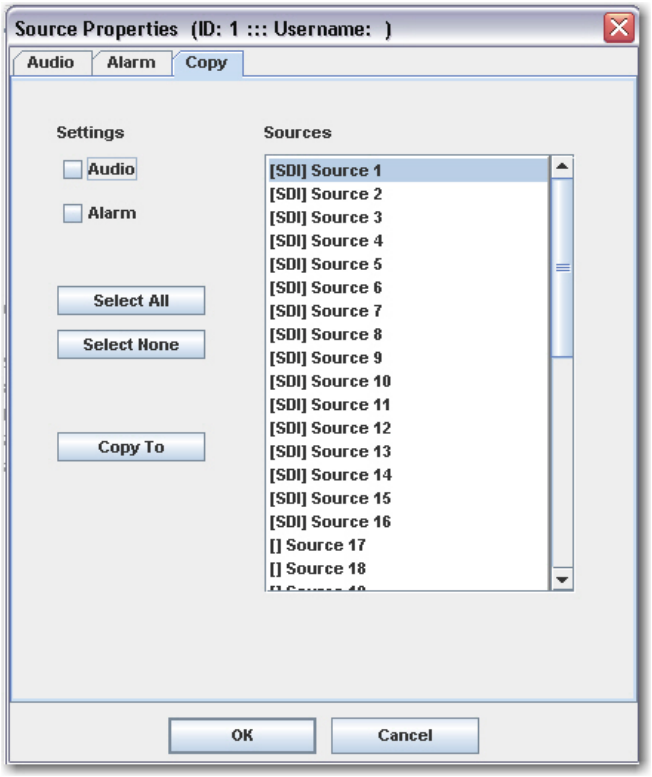

Figure 2-16: MV-16 Source Properties – Copy Tab

Audio	Check to copy audio settings from selected source/s 1 to 40.
Alarm	Check to copy alarm settings from selected source/s 1 to 40.
Select All	Select all sources.
Select None	Deselect currently selected sources.
Copy To	Copy settings to selected source/s.

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Remote Control Setup

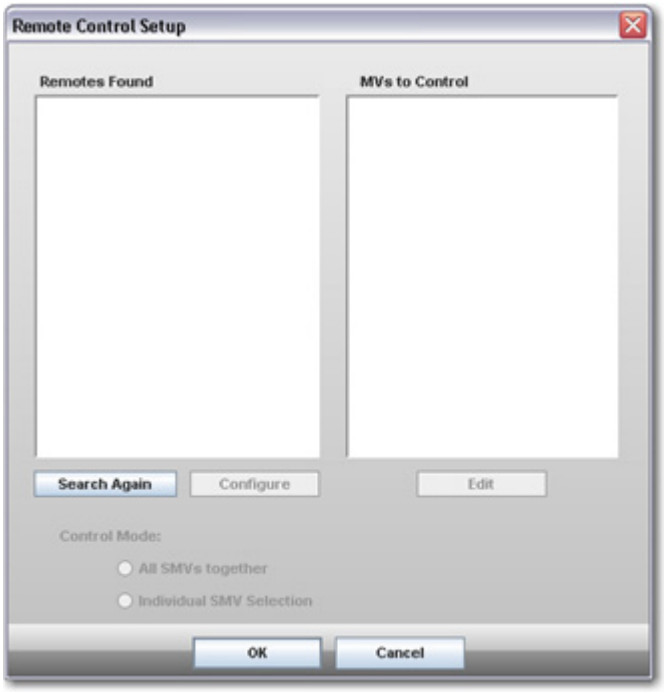

Figure 2-17: MV-16 Remote Control Setup

Search Again	Searches for all MV-Remote control units on the network. These are listed by IP address under Remotes Found.
Configure	Allows the IP settings of the currently selected MV-Remote to be configured.
Control Mode | All MVs together	Check to control two or more MV-16 units (listed by IP address under `MVs to Control`) from the selected MV-Remote.
Control Mode | Individual SMV Selection	Assign a single MV-16 (listed by IP address under MVs to Control) to the selected MV-Remote. To select the individual SMV to control, use INSERT+1 to select the first MV-16 in the list, INSERT+2 to select the second, etc.
Edit	Edit the current MV-Remote assignments.

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2.3.3.2. Layout Menu

The layout menu allows layouts to be created, saved, deleted and for layout settings to be chosen for new layouts.

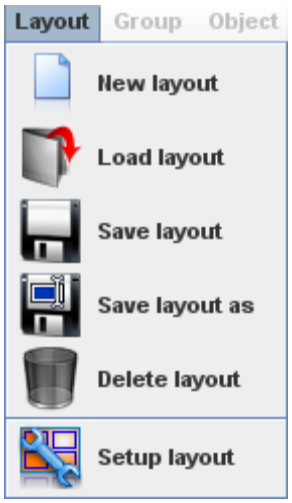

Figure 2-18: MV-16 Layout Menu

New Layout	Offers to save the current layout before removing all objects from the editor workspace ready to create a new layout.
Load Layout	Loads a previously saved layout.
Save Layout	Saves current layout. A name must be given if this is the first time the layout has been saved.
Save Layout As	Saves current layout with a different name.
Delete Layout	Delete a selected layout from the saved list.
Setup Layout	Opens the Layout Properties window Figure 2-19. Choose background type from transparent, colour or bitmap. Also choose new layout style from Centre, Tile or Scale.

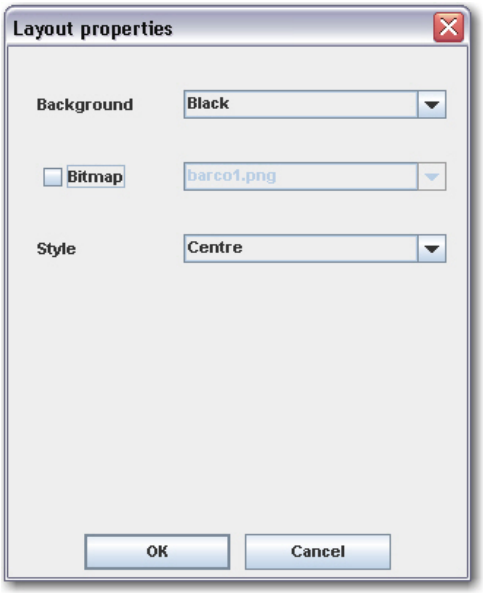

Figure 2-19: MV-16 Layout Properties Dialog

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Background	Set the display background color.
Bitmap	Apply selected bitmap to the background.
Style	Select bitmap style: Centre (centers bitmap); Tile (display bitmap in multiple tiles); or Scale (scales bitmap to fit the display background)

2.3.3.3. Group Menu

The group menu allows object to be selected as a group.

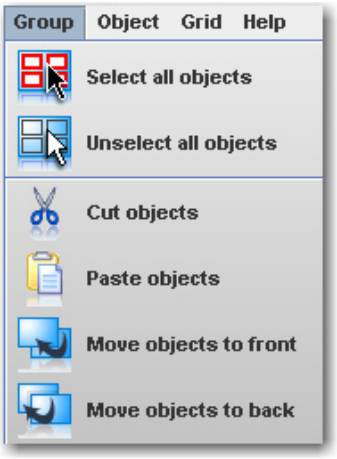

Figure 2-20: MV-16 Group Menu

Select all objects	All objects in the layout will be selected and can be operated on as a group.
Unselect all objects	Cancels group all objects command.
Cut objects	Deletes all the tile objects in the group.
Paste objects	Pastes the object that is on the clipboard to all objects in the group.
Move objects to front/back	Moves all tile objects in the group to the front/back.

Objects can be selected individually to create a group by holding the Ctrl key down before clicking on them.

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2.3.3.4. Object Menu

The settings for the tiles can be manipulated from the object menu. This is accessed either via the main menu, or by a right-click on the tile to be edited.

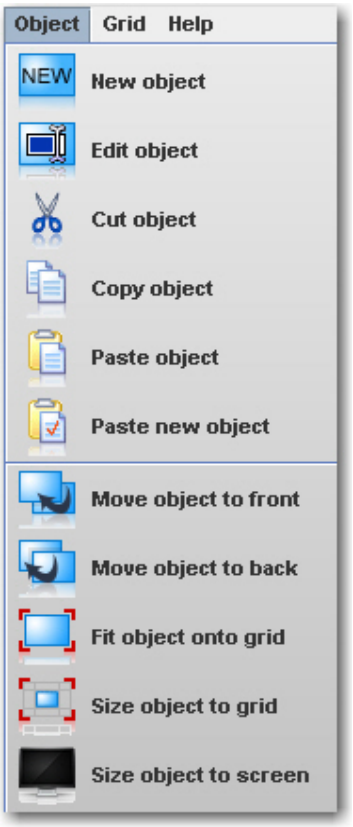

Figure 2-21: MV-16 Object Menu

New object	Creates a new object and open the Edit Object Dialog described in the Edit Object Dialog section.
Edit object	Open the Edit Object Dialog for the tile object that is currently selected.
Cut object	Delete the currently selected tile object.
Copy object	Copy the display properties of the currently selected tile object (excludes source properties
Paste object	Paste the copied the display properties of the currently selected tile object
Paste new object	Create a new object and paste to it any previously copied display properties.
Move object to front	Send the currently selected tile object in front of all other objects.
Move object to back	Send the currently selected tile object behind all other objects.
Fit object onto grid	Expands all edges of the currently selected tile object to the nearest grid.
Size object to grid	Sets the size of the currently selected tile object to the chosen grid pitch.

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Size object to screen	Set the selected tile object to full-screen size.

2.3.3.5. Grid Menu

The grid menu enables the Editor Workspace to be defined by a grid for ease of aligning tiles in a regular arrangement. The Size Object to Grid function in the main toolbar works in conjunction with this feature and automatically sizes the currently selected tile to the cell size of the grid that has been set.

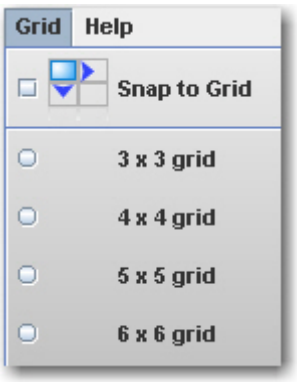

Figure 2-22: MV-16 Grid Menu

Snap to Grid	Check to enable tiles to be snapped to the nearest grid position when repositioning. The tip left corner of the tile is anchored to the top left corner of the grid position.
3x3 grid	Check to define a 3x3 grid.
4x4 grid	Check to define a 4x4 grid.
5x5 grid	Check to define a 5x5 grid.
6x6 grid	Check to define a 6x6 grid.

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2.3.3.6. Help Menu

About

This menu provides current status information on the Browser, CPU and scaler firmware versions.

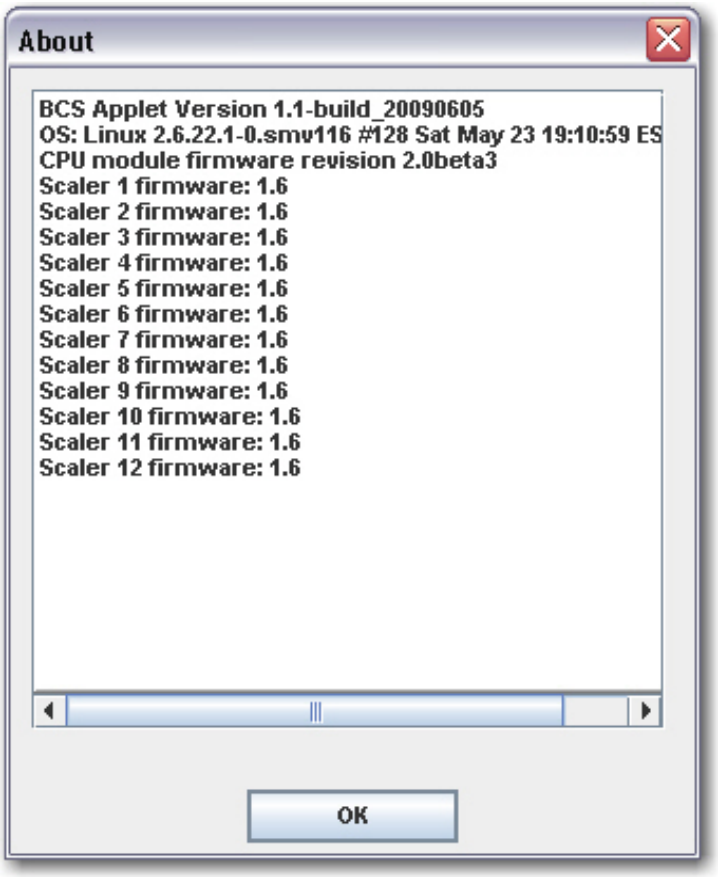
About
BCS Applet Version 1.1-build_20090605
OS: Linux 2.6.22.1-0.smv116 #128 Sat May 23 19:10:59 ES
CPU module firmware revision 2.0beta3
Scaler 1 firmware: 1.6
Scaler 2 firmware: 1.6
Scaler 3 firmware: 1.6
Scaler 4 firmware: 1.6
Scaler 5 firmware: 1.6
Scaler 6 firmware: 1.6
Scaler 7 firmware: 1.6
Scaler 8 firmware: 1.6
Scaler 9 firmware: 1.6
Scaler 10 firmware: 1.6
Scaler 11 firmware: 1.6
Scaler 12 firmware: 1.6
OK

Figure 2-23: MV-16 Help Menu – About Dialog

2.3.3.7. Edit Object Window

The Edit Object menu is used to set up all the attributes of a tile. It can be opened using two methods:

1. Double-click on the object to edit.

   or

2. Go to the Object menu and select Edit Object or New Object.

   The **Edit Object** menu comprises four tabs:

   - **Type**,
   - **Border**,
   - **Properties**, and
   - **UMD**.

   Some controls, such as Properties, depend on the type of tile object.

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Type Tab

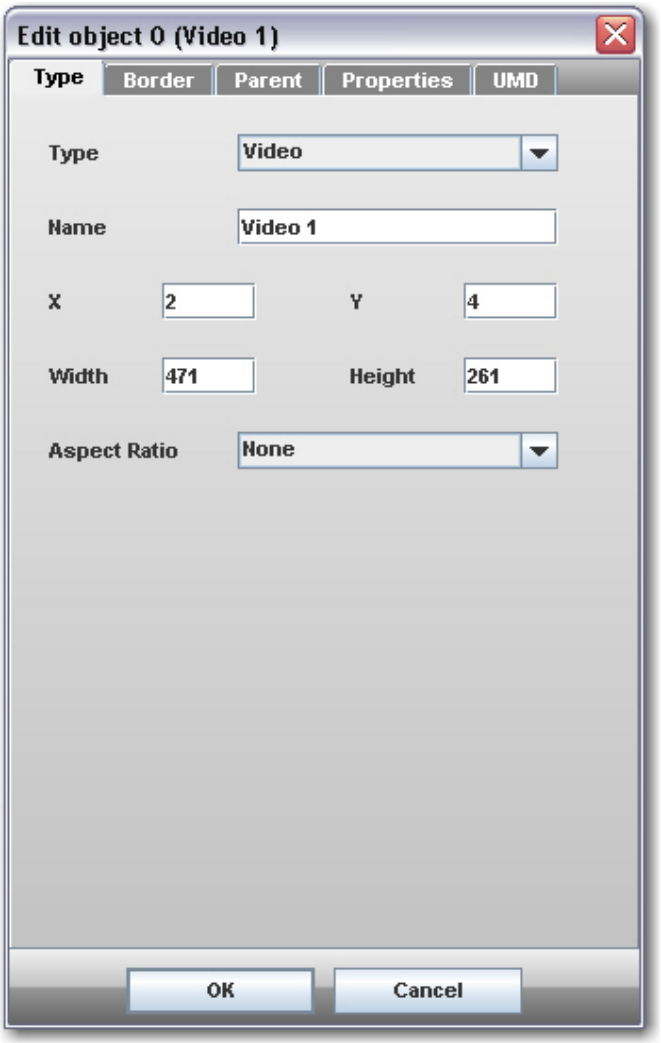

Figure 2-24: MV-16 Edit Object - Type Tab

Type	Defines object type. Choose from None, Video, Audio, Text, Logo, and Clock.
Name	Name of the tile, can be up to 40 characters long.
X, Y, Width, Height	Size and position of the tile can be altered by entering figures here, and any adjustments will be reflected in the outline of the rectangles drawn to represent the tiles. Conversely, any resizing or repositioning of the tiles done graphically will be reflected in the figures presented here.
Aspect Ratio	The aspect ratio can be set to fixed so that as either width or height are changed, height or width, respectively, will be automatically adjusted to retain the ratio.

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Border Tab

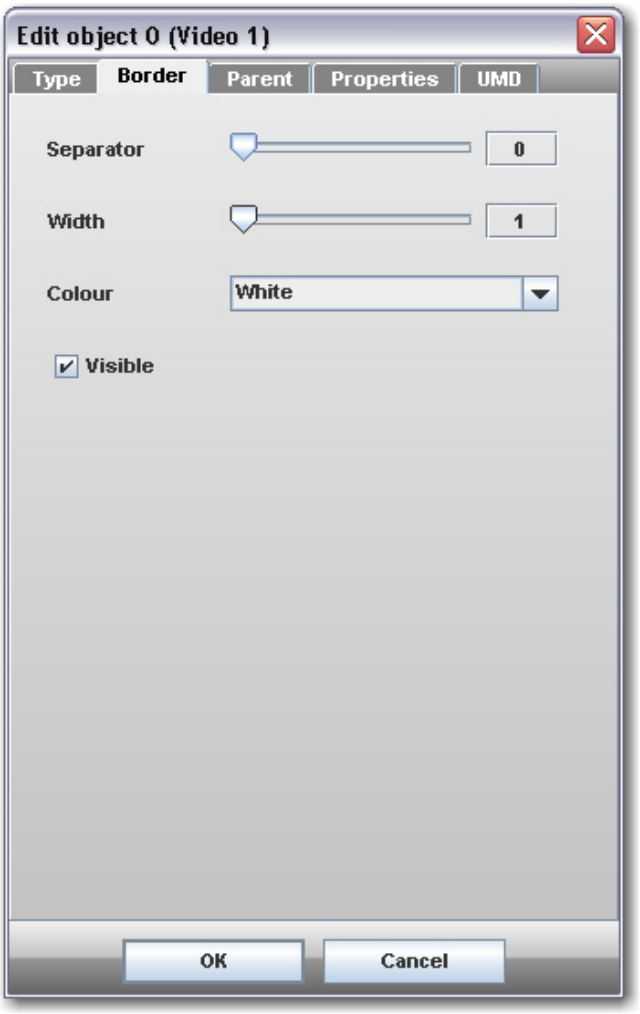

Figure 2-25: MV-16 Source Properties – Border Tab

Separator	Number of pixels separating the edge of the video content from the tile border.
Width	Pixel width of the border.
Colour	Color of the border.
Visible	Turns the border on and off.

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Parent Tab

Assigning a parent object to one or more tiles enables collective positioning and resizing of grouped tiles, which eases the configuration of objects that have a fixed association.

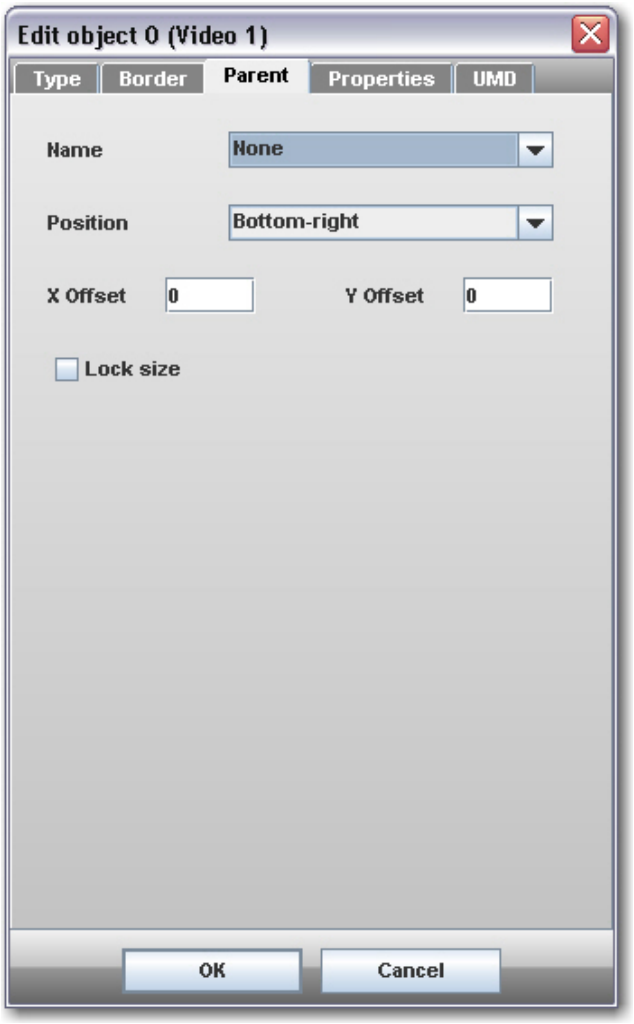

Figure 2-26: MV-16 Edit Object - Parent Tab

Name	for the currently selected tile, select the parent object
Position	set the anchor point of the currently selected tile relative to the parent object.
X Offset / Y Offset	offset of the anchor point of the currently selected tile relative to the parent object.
Lock size	check to lock the scaling of the currently selected tile to that of the parent object.

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UMD Tab

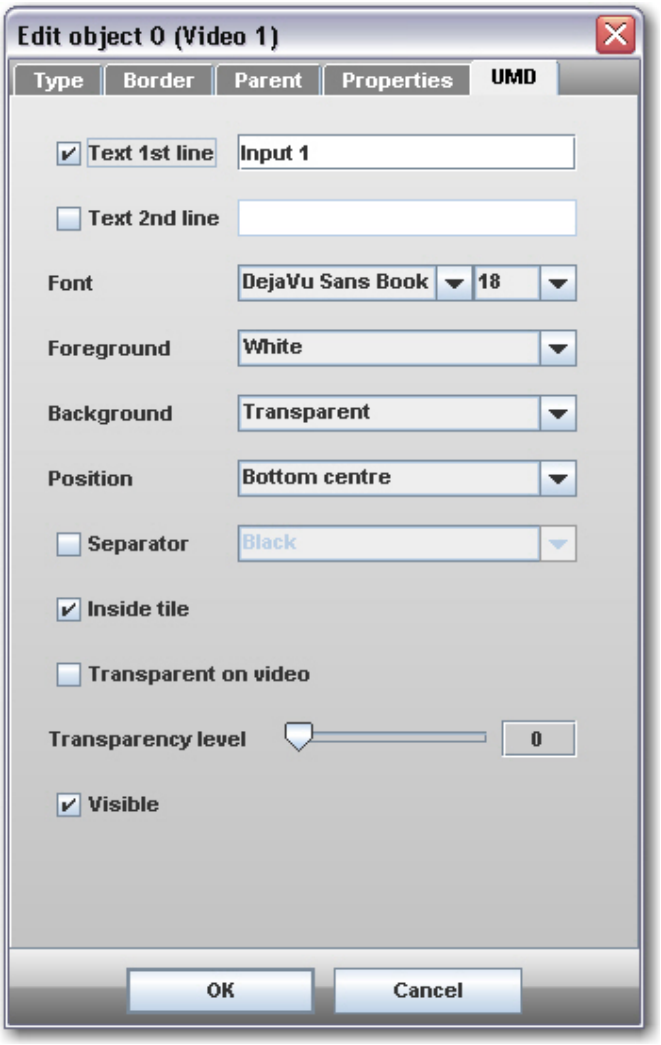

Figure 2-27: MV-16 Edit Object UMD Tab

Text	Enter UMD text and set it to hidden or visible.
Font	Choose font and font-size of the text.
Foreground	Sets the color of the text.
Background	Sets the color of the UMD background.
Position	Position of UMD relative to the tile.
Separator	Places a separator between the UMD and the object's image and also between each line of text. The color of the separator can be chosen
Inside	Places the UMD bar inside the tile (within the active picture).
Transparent on video	Enables the transparency of the UMD when it is in the picture area.
Transparency Level	Sets the transparency of the UMD when it is in the picture area.
Visible	Enables / disables the UMD.

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2.3.3.8. Properties Tab

This tab will not be displayed if the **Object Type** is set to **None** under the **Type** tab.

For each of the other **Object Type** selections, a specific set of controls will appear on the **Properties** tab. The **Object Type** tabs available under **Properties** are:

- Source,
- Audio,
- Error,
- Tally,
- VBI, and
- WSS.

Source Tab

(Video or Audio object)

This tab only exists within the **Properties** tab of Video and Audio type tiles.

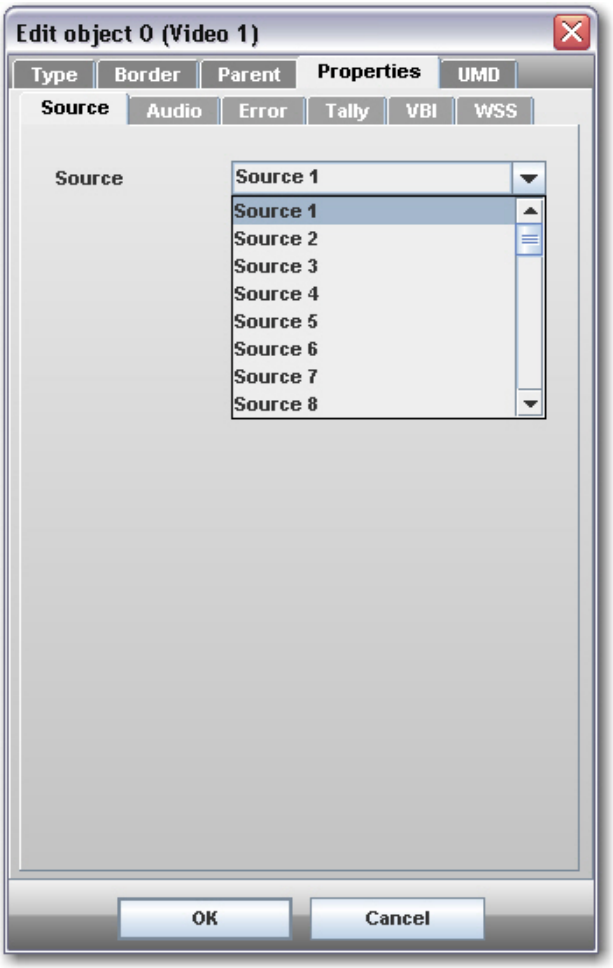

Figure 2-28: MV-16 Edit Object – Properties - Source Tab

Source	For a video tile, this selects the source of the video to display in the tile. For an audio tile, it selects the audio channels that have been set up to be associated with the chosen source.

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Audio Tab

(Video or Audio object)

This tab is only available within the **Properties** tab of Video and Audio type tiles.

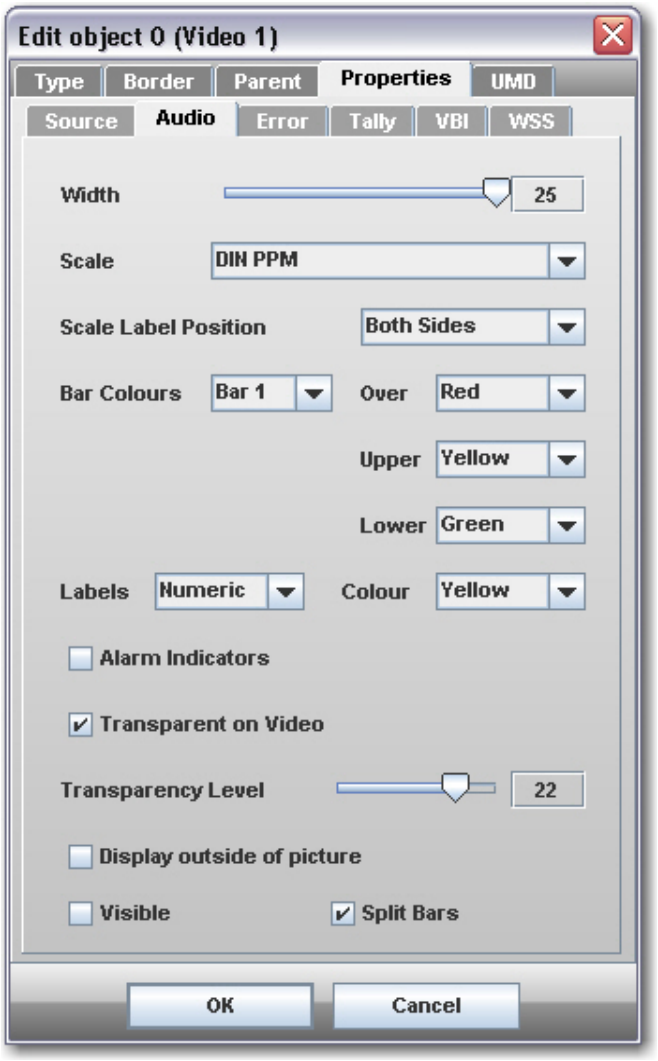

Figure 2-29: MV-16 Edit Object – Properties – Audio Tab

Width	Sets the width of the audio meter bars
Scale	Sets the scale type of all the audio meter bars on display in this tile
Scale Label Position	Sets the positioning of the scale labeling on either side of the meter
Bar Colours	Selects bar to which the color of the over, upper and lower range applies.
Over Colour	Sets the over range color for the bar selected in the Bar Colours control
Upper Colour	Sets the upper range color for the bar selected in the Bar Colours control
Lower Colour	Sets the lower range color for the bar selected in the Bar Colours control

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Labels	Sets the display of the bar labels to either an enumerated format, or the labels as entered for the respective channels, or off
Labels Colour	Sets the color of the bar labels.
Alarm Indicators	Enables the alarm indicators at the top of the bars
Transparent on Video	Enables the transparency of the meter bars when they are on the in-picture area
Transparency Level	Sets the transparency of the audio bars when they are on the in-picture area
Display outside of picture	Extends the width of the tile and displays the meters to the left and right of picture area
Visible	Enables / disables the audio bars
Split Bars	Equally divides the audio bars either side of the picture.

Error Tab

(Video or Audio object)

This tab is only available within the **Properties** tab of Video and Audio type tiles. It determines the behavior of the tile when one of its enabled alarms gets triggered.

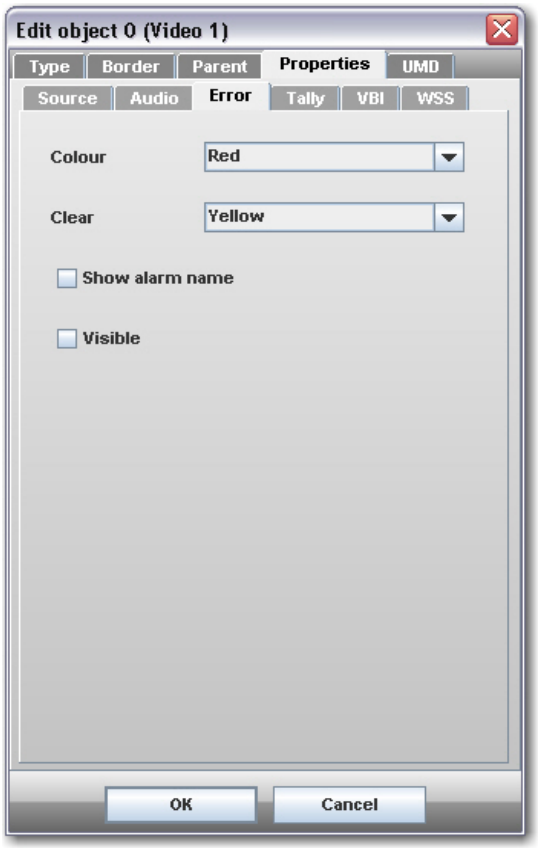

Figure 2-30: MV-16 Edit Object - Properties – Error Tab

Colour	Sets the border color of the tile when an alarm triggers
Clear	Sets the border color of the tile when an alarm has been cleared by the user, but the conditions that caused the alarm to trigger still remain.

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Show Alarm Name	When ticked, all the alarms that are currently triggered will be listed in the tile.
Visible	Must be ticked if any of the alarm indications are to be shown in the tile.

Tally Properties Tab

(Video object)

This tab is only displayed in tiles that are of Video type.

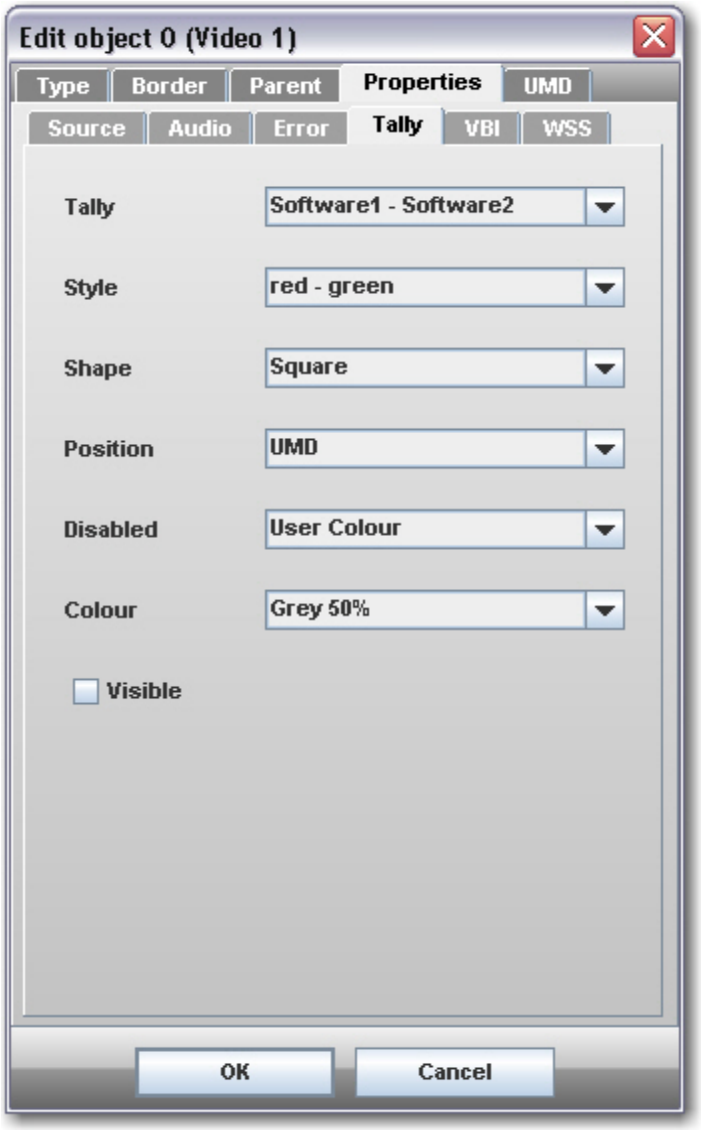

Figure 2-31: MV-16 Edit Object - Properties – Error Tab

Tally	Select hardware, or one of two software tallies. The hardware tally is related to the source of the video window. There are 16 GPI inputs; one for each source. The two software tallies operate in accordance with TSL protocol. This has up to 127 display addresses; each address comprising 4 tallies and a UMD. Address 0 of the protocol is assigned to the first video source. Address 1 is assigned to the second video source, etc. Each video window can use the first 2 tallies of its display address to trigger the 2 tallies available in its UMD bar, or the border tally if set up appropriately
Style	Select red-green, green-red, red-red and green-green.

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Shape	Select fill, square or round.
Position	Select UMD, border or UMD and border.
Disabled	Sets the disabled color to either default disabled color, UMD color, border color, or the user selected color set in the box below this control
Colour	Selects disabled color if disabled color is set to the user-selected source
Visible	Turns the display of the tally on / off

VBI Tab (Video object)

This tab is only available in tiles that are of Video type.

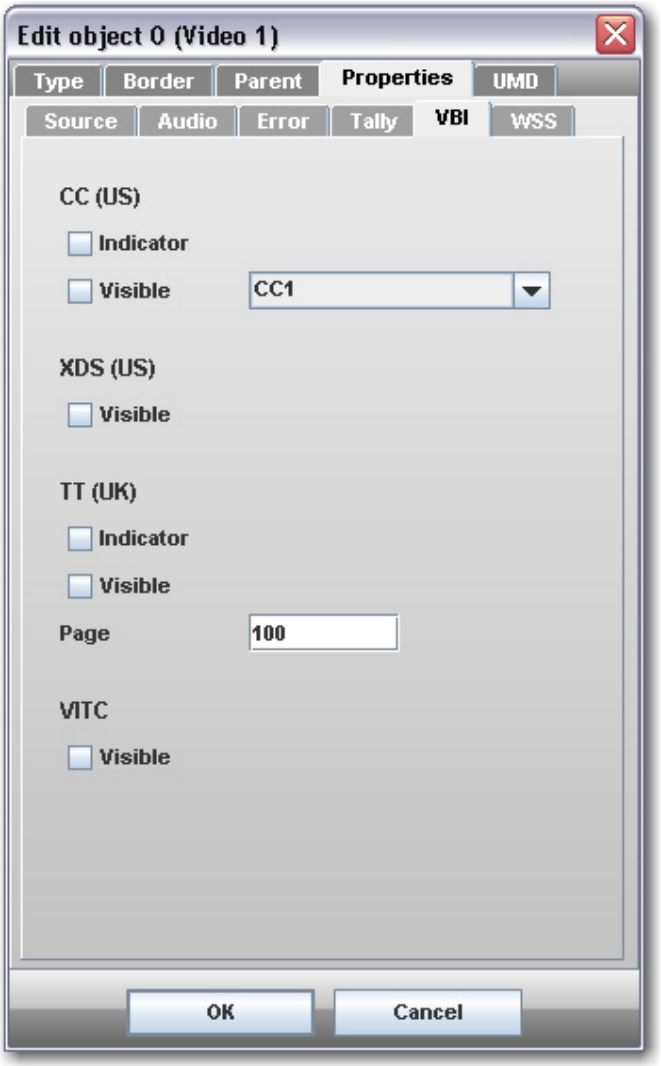

Figure 2-32: MV-16 Edit Object - Properties – VBI Tab

CC Indicator	Enables an indicator to be shown in the tile if the selected closed caption type is present
CC Visible	Displays the closed caption text in the tile if ticked
CC Channel	Selects the channel of the closed caption to encode
XDS Visible	Shows the information contained in the extended data services

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TT Indicator	Enables the indicator to be shown if teletext is present in the video
TT Visible	Displays the teletext from the selected page in the tile if ticked
TT Page	Selects which teletext page is to be viewed
VITC Visible	Enables the display of the vertical interval timecode

WSS Tab (Video object)

This tab is only available in tiles that are of Video type.

Mode	Selects the type of WSS / AFD to decode.
Colour	Sets the color of any cropping of the video that may be needed to display the correct aspect ratio.
Aspect Ratio, Auto size	When ticked, the aspect ratio of the video will automatically respond to any changes in the selected WSS or AFD information.
Aspect Ratio, Default	Chooses the aspect ratio to use when the correct one is unknown (for example if WSS or AFD is not present).
Aspect Ratio, Indicator	When ticked, this will present an indicator in the tile if there is aspect ratio information available.

CC and TT are available on analogue inputs only.

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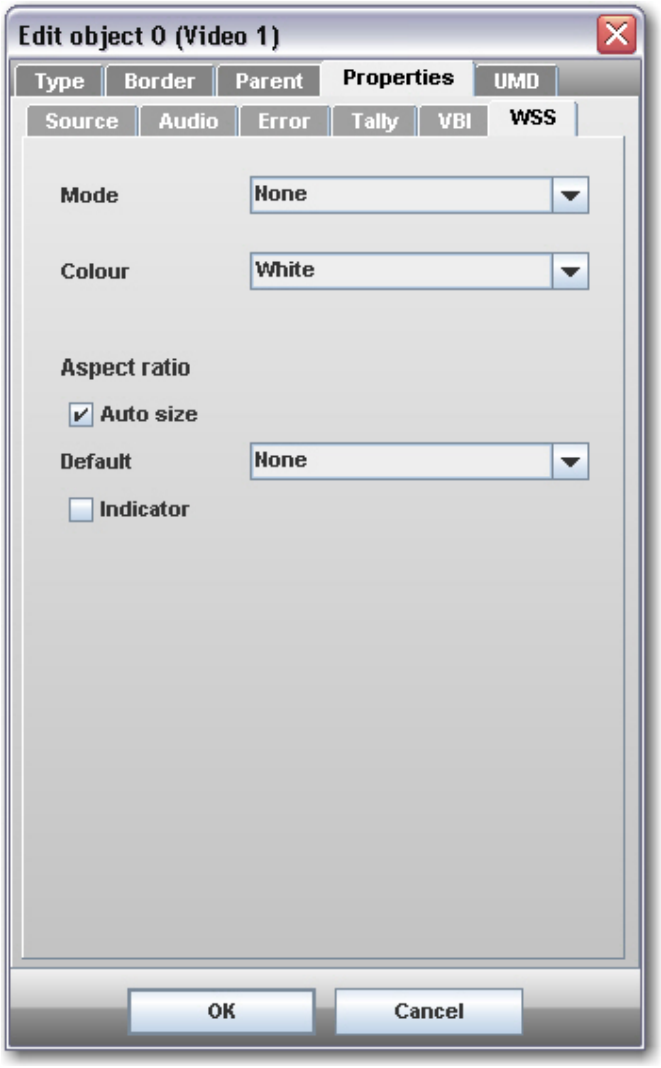

Figure 2-33: MV-16 Edit Object - Properties – WSS Tab

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Text Tab (Text object)

This tab is only available in tiles that are of Text type.

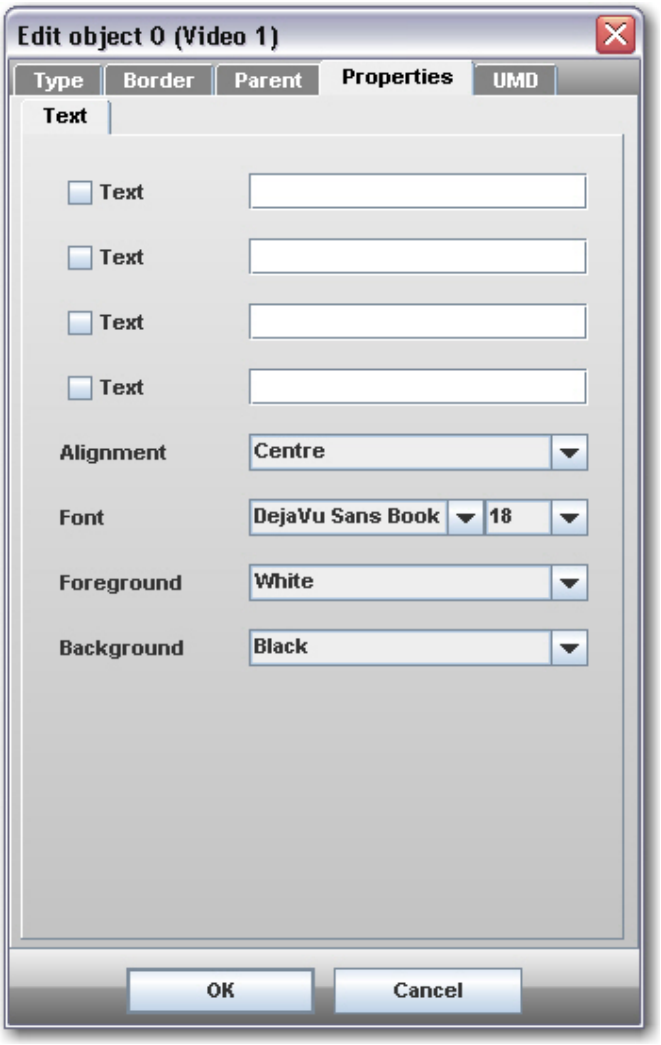

Figure 2-34: MV-16 Edit Object - Properties – Text Tab

Text	Enter up to four lines of text and set it to hidden or visible.
Alignment	Justify text within the tile.
Font	Select font and point size.
Foreground	Set text color.
Background	Set text background color.

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Logo Tab (Logo object)

This tab is only available in tiles that are of Logo type.

Figure 2-35: MV-16 Edit Object - Properties – Logo Tab

File name	Select one of the stored logo files.

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Clock Tab (Clock object)

This tab only exists in tiles that are of Logo type.

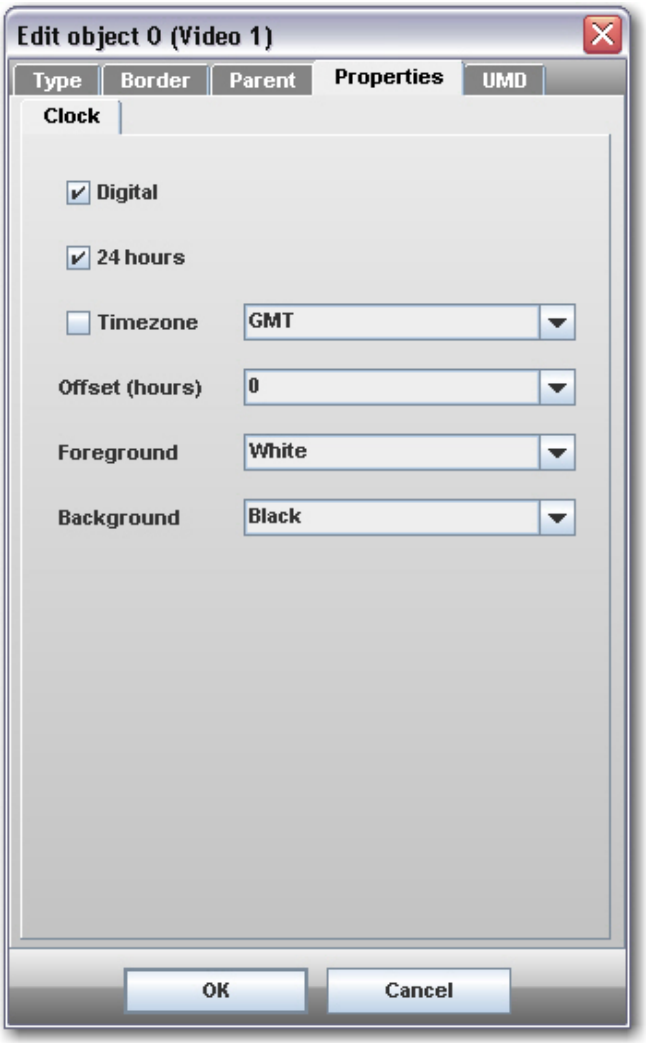

Figure 2-36: MV-16 Edit Object - Properties – Clock Tab

Digital	Check for digital clock type, uncheck for analogue type.
24 hours	Check for 24 hour clock (applicable to digital clock type only).
Timezone	Check to set clock time to GMT, or within the range of GMT -1 to GMT +12.
Offset (hours)	Applies offset from -12 to +12 hours (works in combination with Timezone setting, if checked).
Foreground	Set the clock colour (digital clock only).
Background	Set the clock background colour (digital clock only).

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3. Installation

The MV-16 1U frame may be installed in 19 inch bays with 426mm depth (~450mm including connectors). Ventilation is produced in each frame with exhaust fans on the left hand side (viewed from front) and intake grilles at the right. Frames should be installed into bays such that airflow through these apertures is not impeded.

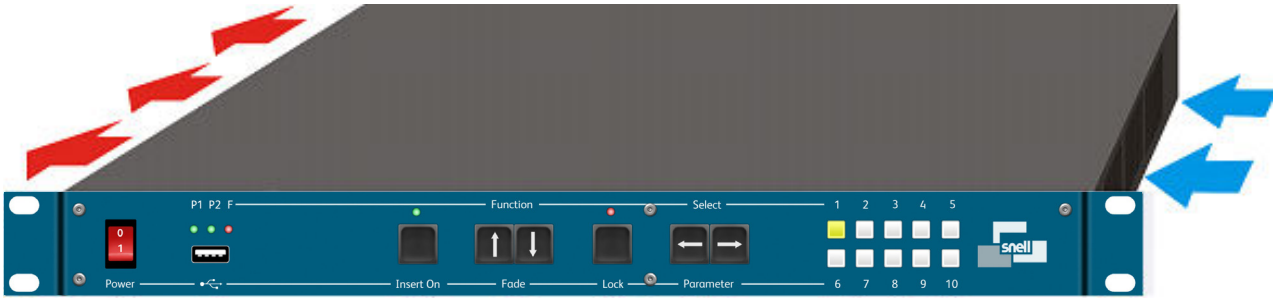

Figure 3-1: The 1U MV-16 frame showing main side to side ventilation

The front rack ears are intended to provide a means of retaining the unit in the rack.

To ensure adequate support the unit MUST also be supported at the rear of the frame. Please ensure that ventilation is not impaired when selecting suitable supports.

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3.1. Power and fuses

The mains voltage (240/100 volts) will be auto detected provided it is in the range 90 – 240 V and 47 – 63Hz. A 5A fuse is fitted and a spare fuse should be located under the pull-out flap.

3.2. Health and safety considerations

For your own protection, observe the following safety precautions when installing, operating and servicing your device:

The Installation and Maintenance of the MV-16 unit and any associated equipment must be carried out by PERSONS SUITABLY QUALIFIED to work with equipment which may be connected to the mains supply.

The unit MUST BE DISCONNECTED & ISOLATED FROM THE MAINS INPUT and from other product outputs before undertaking maintenance.

ELECTRIC SHOCK HAZARDS exist if conductive instruments, neck chains or fingers etc. are placed within the unit or in close proximity of the input/output terminals/connectors.

Incorrect installation can cause internal components to rupture and particles to be ejected from the product.

TOXIC FUME HAZARDS exist if the unit is subjected to direct flames or excessive temperature of above 100 Degrees Centigrade ambient.

The mounting and installation of the unit must be arranged by the user to comply with all safety regulations by the indigenous authority.

3.2.1. Disposal

Do not incinerate as explosive and toxic fume hazards exist. Disposal must be by dismantling the product to component level and disposing of each component by an approved method.

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3.3. Connector I/O

The MV-16 uses coaxial BNCs for the video inputs, LTC and sync inputs. Microcross connectors are fitted for the two DVI-I inputs and one output. The GPI I/O connector is a high density 26 way female 'D' connector. External audio connections (input or output) are via a pair of female 37 way ‘D’ connectors, with audio monitoring outputs on a male 25 way 'D’ connector. The serial port comprises a 9 way female 'D' connector. A standard RJ45 connector is provided for LAN connection and a USB connector on the front panel is provided for connecting a keyboard. (A pack of mating 'D' type connectors is supplied with the unit).

Figure 3-2: MV-16 1U frame rear connector I/O

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3.4. Input card configurations

The MV-16 may be fitted with up to four MV-VIP1 or MV-VIP2 video input cards, or any combination of the two types. Additionally, an external analogue or digital audio I/O card may be fitted to a dedicated card slot as an option.

MV-VIP1 video cards support the following standards:

- Composite video PAL/NTSC, CVBS - 1Vpp
- SDI - SMPTE 259M
- DVI-I - digital or analogue component, 1920 x 1080
- S-Video (Y/C)
- Component video RGB/YUV

The MV-VIP2 video card supports HD-SDI up to SMPTE 292M 3G, in addition to the standards supported by the MV-VIP1 card.

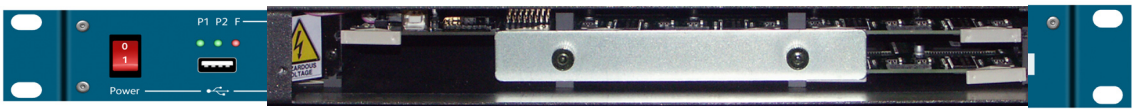

Figure 3-3: MV-16 1U frame with front panel removed

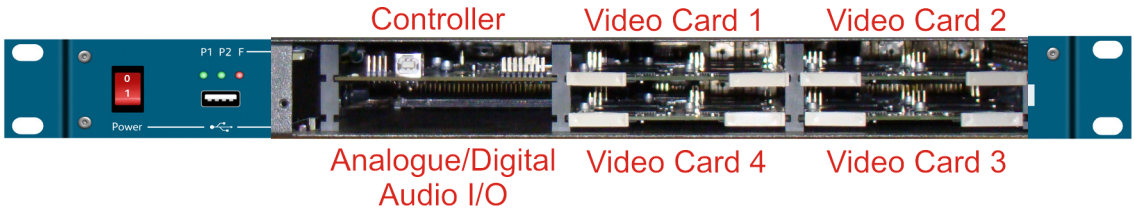

Figure 3-4: MV-16 1U frame card slot positions

The controller card is always fitted in the top left slot and the Analogue/Digital audio card is always fitted in the bottom left slot. Video input cards are installed in the remaining slots as shown above.

The card retaining strip that is accessible behind the front panel of the unit must first be re-moved before cards can be fitted or extracted. I/O cards are hot-swappable and may be freely inserted and removed while the unit is powered. Changes are normally recognized immediately, however inserting analogue cards may force a system reset. This is not harmful and the inserted cards will always be recognized following a reboot.

3.4.1. Video Inputs

All inputs (except DVI-I) are assigned to the 16 x BNC input connectors at the rear of the unit. Up to 16 inputs can be applied if the configured video format uses a single BNC (SDI, HD-SDI, composite). For S-Video, two connectors are required, for RGB/YUV three connectors are required.

There are two DVI-I input connectors, as this is the maximum number of DVI-I inputs supported per frame. All input types are assigned within the unit's system menu.

Component inputs such as YUV or RGB require three connections per channel and only one channel can be handled per input card. However, a further two channels can be fed via the analogue pins of the two DVI input connectors (and suitably assigned in the unit's menu) making a maximum total of six channels. Any unused BNCs can be used for other video formats.

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For Y/C, two connections per channel are required. Therefore two channels can be handled per input card, giving eight channels per frame. Any unused BNCs can be used for other video formats.

3.4.2. Video Outputs

The main DVI-I output supports resolutions up to HD 1080p60, 16:9 (1920 x 1080). Both digital and analogue outputs are available on this connector. Images on the output screen can be varied continuously in size and position, cropped or displayed in pre-configured screen layouts on a chosen colored background.

The main output is also used to display the unit's system menu when screen configuration and set-up options are selected. This is not necessary when using external control via the LAN.

3.4.3. Audio I/O

Audio levels may be displayed using up to 16 bargraphs in each tile, either superimposed on each video image or outside active video. Audio is derived from the incoming embedded audio (when using SDI or HDSDI inputs), or from up to 32 channels from external analogue or AES/EBU sources, for which the appropriate audio input card option must be installed.

Additionally, external audio may be monitored using level data from the Snell NGM-164 via the LAN.

When external inputs are not required, an optional output card (32 channels analogue or 16 AES/EBU pairs) may be employed to provide demuxed outputs from embedded audio.

There is an 8 channel analogue audio monitor output, which may be assigned from any input channel of any format, excluding incoming external audio level data.

The number of audio channels described always refers to individual channels, not channel pairs. For example, eight monitor outputs relate to eight individual analogue channels or 4 pairs AES/EBU channels.

All bargraph scales and ballistics conform to international standards and include BBC PPM, DIN PPM, Nordic PPM, VU, extended VU, and AES/EBU digital.

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3.5. Serial port assignments

There is a single serial data port that can be configured for either RS232 or RS422 operation. The mode of operation is set by means of jumpers (J13 and J14) on the CPU board. The pin assignment of the connector is given in section 6.2 Interfaces.

Jumpers J1, J13 and J14 are located on the Controller (CPU) card. Access requires the removal of the CPU card from the front of the unit with the power removed.

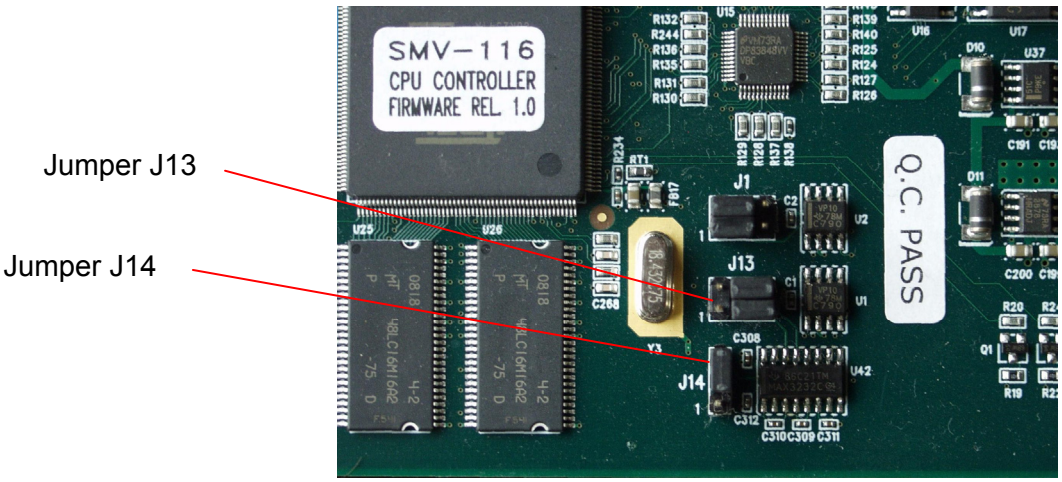

Figure 3-5: MV-16 CPU Card

Jumper	Position 1/2	Position 2/3
J1	used for debugging	normal
J13	RS422	RS232 (set in conjunction with J14)

Figure 3-5 is of the CPU card showing the jumpers, the table above shows the jumper settings.

Pin 1 is indicated on the PCB. Other CPU card settings and controls are for factory use only.

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3.6. *Audio I/O connector pin assignments*

AES/EBU inputs or outputs (depending on the card fitted) may be jumper selected per channel to be either balanced or unbalanced. The settings are set via jumpers on each digital audio input card.

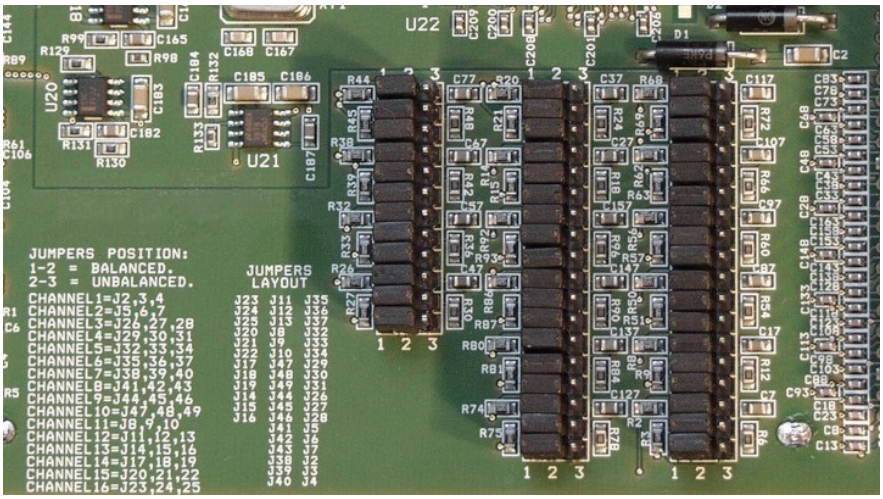

Figure 3-6: AES/EBU digital audio input card bal/unbal settings

Position	Meaning
1/2	balanced
2/3	unbalanced

Channel	Jumpers	Channel	Jumpers
1	J2, J3, J4	9	J44, J45, J46
2	J5, J6, J7	10	J47, J48, J49
3	J26, J27, J28	11	J8, J9, J10
4	J29, J30, J31	12	J11, J12, J13
5	J32, J33, J34	13	J14, J15, J16,
6	J35, J36, J37	14	J17, J18, J19
7	J38, J39, J40	15	J20, J21, J22
8	J41, J42, J43	16	J23, J24, J25

The pin assignment of the connector is given in section 6.2 Interfaces.

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3.7. Remote Panel

The remote panel may be installed in 19 inch bays with 114mm depth (~140mm including connectors) and has the same control functions as the main frame.

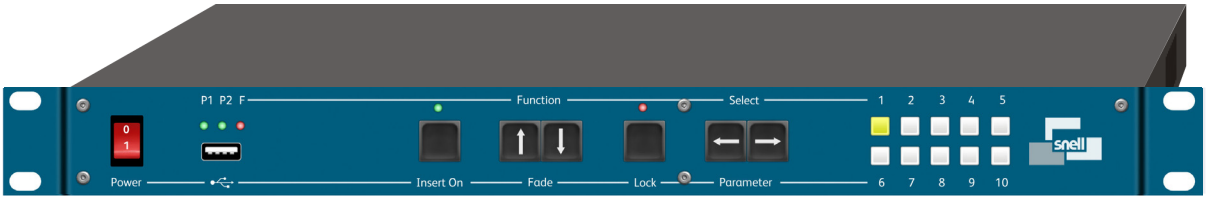

Figure 3-7: The 1U MV-16 frame showing main side to side ventilation

It is also fitted with rack mount ears but does not use forced cooling.

Preset configurations already stored in the MV-16 can be recalled by briefly pressing the desired pre-set button (1–10 on the right side of the panel), which will illuminate. A current multi-viewer configuration may be stored as one of ten user presets by depressing the chosen button number for at least three seconds.

A MV-Remote control panel may be set either to address single or multiple MV-16 units. When addressing multiple units ('collective mode'), only the preset storage and recall buttons are operative and all systems will respond in parallel, e.g., store or recall preset 1-10. Other control keys and the keyboard socket cannot be used in collective mode.

3.7.1. Connection

Communications between MV-Remote and MV-16 are handled via LAN. Where there is a requirement for two or more control panels in different areas, additional MV-Remote units can be cascaded from the first via RS422.

3.7.1.1. Network connection and setup

Should the Remote Panel to be connected via LAN, the network settings of the Remote Panel are configured entirely by the MV-16. Multiple Remote Panel configurations can be present on the same network, therefore a MV-16 does not automatically acquire remote units that it finds on the network; this has to be done manually from the MV-16 menu or web interface. With the MV-16 and Remote Panel connected to the network, the following steps must be carried out to initialize communications:

If installing multiple new Remote Panels, it is a good idea to connect them one at a time to the network, because they will all have the same default IP address and will therefore not be distinguishable from one another.

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3.7.1.2. Cascading multiple Remote Panels via RS422

Once the first Remote Panel has been connected to MV-16 via LAN, any additional remote units may be cascaded from the first, by means of a pin-to-pin RS422 cable. The DATA OUT port of the first unit is connected to the DATA IN port of the second unit.

The following table shows the connections between multiple Remote panel units.

Signal	Remote Panel DATA IN	Remote Panel DATA OUT
GND	4, 5, 9	4, 5, 9
RX+/RX-	2	2
TX+/TX-	3	3
RX-/RX+	7	7
TX-/TX+	8	8

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4. Uploading graphics files

Graphics files may be uploaded to the frame and assigned as tile objects for display. They might be used for channel identification purposes and up to four images may be displayed at any one time.

Graphics files to be stored in the frame must be in the `.bmp` .png format. Uploading the files is performed using a PC connected to the MV-16 LAN port directly, or over a network.

1. Establish communication with the MV-16 frame by using Windows Explorer to search for the IP address of the frame: ftp://xxx.xxx.xxx.xxx.
2. Right click in the right hand side of the Windows Explorer page and select Login As… from the menu. The FTP server Log On As window appears. Log in with the user name root, using the password smv. The complete list of currently loaded files is revealed.
3. Copy the graphics file or files to the clipboard and paste them into the right hand side of the Windows Explorer page.
4. The file transfer will begin.
5. When the upload is complete, reboot the frame to update the file list.

The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

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5. Upgrading Firmware

From time to time, firmware updates may be made available. The current firmware status of the multi-viewer can be checked in the browser interface Help / About menu, or the on-screen Configuration Mode menu. Uploading new firmware files is easily performed using a PC connected to the MV-16 LAN port directly, or over a network.

1. Establish communication with the MV-16 frame to be upgraded by using Windows Explorer to search for the IP address of the frame: ftp://xxx.xxx.xxx.xxx
2. Copy the replacement file or files to the clipboard and paste them into the right hand side of the Windows Explorer page.
3. The file transfer will begin.
4. When the upload is complete, reboot the frame to enable the updates to take effect. This will take several minutes to complete, depending on the nature of the updates.

The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

Other freely available or commercial FTP clients may be used as an alternative to Windows Explorer. For example, WinSCP. This may be required should difficulties be encountered using Windows Explorer. For example, file transfer could be blocked by some Windows security measures. The procedure when using other FTP clients is generally similar.

1. Open the FTP client.
2. Enter the IP address of the MV-16 as the Host Name.
3. Enter ‘ftp’ as the User Name (no password required).
4. Check that the file protocol is set for FTP and press Enter or Login (as required).
5. If prompted for a password, leave blank and press OK.
6. A window will appear. Copy the new firmware files from the left-hand side (PC) and paste to the right-hand side (MV-16).
7. If in any doubt as to the procedure for your specific FTP client, consult the appropriate user guide or product vendor.

The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

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5.1. Updating the scalers

Some firmware updates may include additional revisions for the video board scalers. The requirement for updating the scalers can be determined by going to the Help - About menu. If any scalers need updating, then there will be a tag "(needs updating)" next to the scalers listed. Where scaler updates are required, proceed with steps 1 to 3 above and continue as follows (note that this process takes approximately 25 minutes for each installed video board):

Open a DOS command window.

At the command prompt type; ‘telnet 192.168.0.120’, or whatever the current IP address is set to.

Log in with the user name ‘root’, using the password ‘smv’.

Type; ‘./update-scalers’

The status of the update will be indicated in the command window. Ensure that when the process is complete, all scalers have been updated (there are four scalers per video board).

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6. Technical appendix

This chapter provides tabular overviews about the technical details of the MV-16, its components and of their interfaces.

6.1. Technical data

The following table contains data relating to the Main Frame.

Item	Description
Signal Inputs	
Video	Up to 16 video inputs (4 per video I/P card). Video I/P card MV-VIP1, any mix of: Composite video PAL, PAL-M, NTSC, NTSC-4.43, SECAM, CVBS: 1Vpp S-video (Y/C) Component video RGB / YUV SDI – SMPTE 259M Two DVI-I digital or analog component DIV input formats: 800x600 @ 60Hz, 1024x768 @ 60Hz, 1280x1024 @ 60Hz, 1280x768 @ 60Hz, 1600x1200 @ 60Hz, 1920x1080 @ 60Hz Video I/P card MV-VIP2, same as MV-VIP1, plus HD-SDI – SMPTE292M - 1920x1080i60, 1920x1080i59.94, 1920x1080i50, 1920x1080p30, 1920x1080p29.97, 1920x1080p25, 1920x1080p24, 1920x1080p23.98, 1280x720p60, 1280x720p59.94, 1280x720p50, SMPTE424M - 1920x1080p60, 1920x1080p59.94, 1920x1080p50 (some connector related limitations apply) Auto-sense on composite, SDI and HD-SDI feeds
Embedded audio	Embedded audio derived from SDI/HD-SDI (up to 16 channels per source)
External audio	Via optional input cards: Analog – up to 32 channels (16 pairs) AES/EBU – up to 32 channels (16 pairs) with SRC (32kHz-96kHz resampled to 48kHz)
Outputs	One DVI-I output supporting resolutions; XGA, 720p60, 720p50, SXGA, SXGA+, 1080p60, and 1080p50 (as per the pixel aspect ratio, or other selectable options for non-square pixels). Processing delay approximately 1 video frame, depending on video source. Video sources fully scalable and displayed in native format (4/3, 16/9) Audio monitoring output, up to 8 analog output channels as standard Audio bars superimposed or external to video Genlocked video sources

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Alarms	
Video inputs	Sync loss, Black, Freeze frame
Audio inputs	Loss of embedded or external audio, over-level, out of phase channel pairs
Metadata inputs	Loss of VITC (SDI only), teletext (analogue), subtitles, video non-sync detection Loss of V-chip (composite only)
Alarm indication	Visual (in display), GPI, LAN, SNMP traps
Metadata	
Decoding/monitoring	Teletext (analogue), Subtitles, AFD driving aspect ratio (SDI only), WSS driving aspect ratio (composite only), VITC (SDI only)
GPI I/O	16 inputs and 8 outputs
Scales and Ballistics	
NORDIC:	Overall dynamic range: 54dB (+12 to -42dB) Attack time: 10mSec Decay time: 1.7Sec per 20dB decay
DIN PPM:	Overall dynamic range: 55dB (+5 to -50dB) Attack time: 10mSec Decay time: 1.5Sec per 20dB decay
BBC PPM:	Overall dynamic range: 24dB +3dB down "Mark 1" (+12 to -12dB) Attack time: 10mSec Decay time: 2.8Sec per 24dB decay (from "Mark 7" to "Mark 1")
VU:	Overall dynamic range: 23dB (+3 to -20dB) Attack time: 300mSec Decay time: 300mSec per 20dB decay
VU EXT:	Overall dynamic range: 60dB (+10 to -50dB) Attack time: 300mSec Decay time: 300mSec per 20dB decay
AES/EBU:	Overall dynamic range: 60dB (0 to -60dB) Attack time: < 5ms Decay time: 1.5Sec per 20dB decay
Phase Correlation Display	Attack time: 0.4Sec for zero to ±1 deviation Decay time: 0.4Sec for ±1 to zero deviation Input dynamic range: 45dB Minimum input level: -45dBu
Mechanical	1U 19” Rack Mount box. Outline Dimensions: 484mm(W) x 426mm(D) x 44.5mm(H) Weight: 8kg (full frame)

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Power	Autosensing, 90 – 240 V and 47 – 63Hz, dual redundant mode power supplies. Power supply and fan failure LED indicators on front panel. Maximum power consumption 190W (fully loaded frame with 16 x 3G video sources)
Environmental	Temperature 0°C to 30°C Humidity 70% max.
Cards	Video Input card A: composite, SDI, DVI-I, S-Video, Component Video Input card B: as card A with HD-SDI Audio input or output card consumes 1 slot All input and output cards are hot-swappable
Front panel	USB connector for keyboard 10 preset buttons 6 on-screen menu control buttons
Rear panel	2 x 32 way ‘D’ input connectors for audio inputs / outputs 2 x DVI-I connectors for digital or analog component inputs 1 x DVI connector for digital or analog display 16 x BNCs for autosensing video inputs 1 x BNC for LTC input 1 x BNC for video sync input 1 x 25 way 'D' connector for audio monitoring out 1 x RJ45 connector for Ethernet (LAN) for browser, NTP clock update and/or remote panel control 1 x RS232/RS422 connector for UMD tally via TSL, Image Video or other protocols 1 x 26 way 'D' connector GPI/O port

The following table contains data relating to the Remote panel.

Item	Description
Front panel	USB connector for keyboard 10 preset buttons 6 on-screen menu control buttons
Rear panel	1 x RJ45 connector for Ethernet (LAN) for browser, NTP clock update and/or remote panel control 1 x RSRS422 DATA IN connector 1 x RSRS422 DATA OUT connector
Mechanical	1U Remote Panel Outline Dimensions: 484mm(W) x 114mm(D) x 44.5mm(H) Weight: 2kg
Power	Autosensing, 90 – 240 V and 47 – 63Hz power supply. Power supply and fan failure LED indicators on front panel (for MV-16).

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6.2. *Interfaces*

Seen from the back of MV-16.

6.2.1. D-sub 9 serial interface, RS 232, RS 422

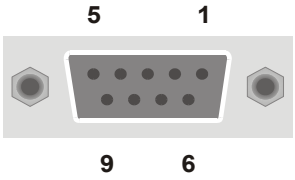

Figure 6-1: RS 232 and RS 422 Connector

The following table gives the pin assignments for the RS 232, RS 422 D-sub 9 serial interface.

	RS 232	RS 422
1	–	GND
2	TxD	RxD-
3	RxD (inactive in half duplex mode)	TxD-
4	DTR (jumper JP1 on 2 & 3	–
5	GND	–
6	–	–
7	RTS	RxD+
8	–	TxD+
9	–	–

6.2.2. GPI I/O connector

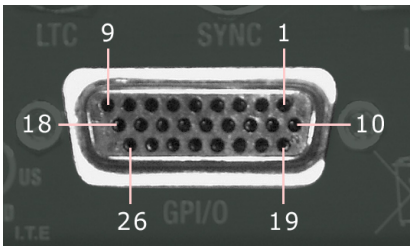

Figure 6-2: RS GPI I/O

The following table gives the pin assignments for the RS GPI I/O.

1	GPI-I 2	14	GPI-I 13
2	GPI-I 5	15	GPI-I 16
3	GPI-I 8	16	GPI-O 2
4	GPI-I 11	17	GPI-O 5
5	GPI-I 14	18	GPI-O 8
6	GPI-O 1	19	GPI-I 3
7	GPI-O 4	20	GPI-I 6

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8	GPI-O 7	21	GPI-I 9
9	GND	22	GPI-I 12
10	GPI-I 1	23	GPI-I 15
11	GPI-I 4	24	GPI-O 3
12	GPI-I 7	25	GPI-O 6
13	GPI-I 10	26	5V (via 0.5A resettable fuse)

GPIs are not pulled up internally on the MV-16, so must be pulled up to +5V externally via a resistor (10kΩ to 100kΩ). +5V out is provided on the GPI connector for this purpose.

6.2.3. Analog audio in/out connector D-sub 37 female

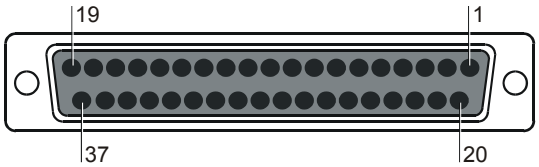

Figure 6-3: 37 pole sub-D female connector

The following table gives the pin assignments for the 37 pole sub-D female connector.

analog				digital			
pin	**signal**	**pin**	**signal**	**pin**	**signal**	**pin**	**signal**
1	common GND	20	16-	1	common GND	20	
2	16+	21	15-	2		21	8-
3	15+	22	14-	3	8+	22	
4	14+	23	13-	4		23	7-
5	13+	24	common GND	5	7+	24	common GND
6	12+	25	12-	6		25	
7	11+	26	11-	7	6+	26	6-
8	10+	27	10-	8		27	
9	9+	28	9-	9	5+	28	5-
10	common GND	29	8-	10	common GND	29	
11	8+	30	7-	11		30	4-
12	7+	31	6-	12	4+	31	
13	6+	32	5-	13		32	3-
14	5+	33	common GND	14	3+	33	common GND
15	4+	34	4-	15		34	
16	3+	35	3-	16	2+	35	2-

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17	2+	36	2-	17		36	
18	1+	37	1-	18	1+	37	1-
19	common GND			19	common GND		

6.2.4. Analog monitor out connector D-sub 25 male

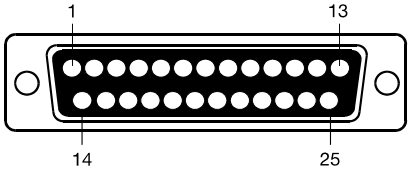

Figure 6-4: 25-pole sub-D female connector

The following table gives the pin assignments for the 25-pole sub-D female connector

pin	signal	pin	signal
1	In 8+	14	In 8-
2	In 8GND	15	In 7+
3	In 7-	16	In 7GND
4	In 6+	17	In 6-
5	In 6GND	18	In 5+
6	In 5-	19	In 5GND
7	In 4+	20	In 4-
8	In 4GND	21	In 3+
9	In 3-	22	In 3GND
10	In 2+	23	In 2-
11	In 2GND	24	In 1+
12	In 1-	25	In 1GND
13	–		

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7. Trouble shooting

7.1. Problem solving

The power switch should illuminate red whenever mains power is supplied. Always make sure that power is connected before using the problem solving guide.

A spare fuse is supplied in space provided in the IEC mains connector before the unit leaves the factory. Always replace the fuse with one of the correct value as shown in the Installation section.

In the event of a power supply failure, there is front panel and remote panel indication. The second supply is able to sustain operation of the unit until it can be removed from service and the fault rectified.

The table in section 7.1.1 provides some sample faults and their solutions.

For faults outside these, contact the Snell Customer Service desk.

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7.1.1. Sample problems and their solutions

There is no video output

Check that there is power to the unit and that it is turned on.

Check that the video output resolution is not beyond the capability of the display. (see answer to question below).

An output should be seen once the unit has booted.

The image appears fuzzy or lacking clarity

If an analog or digital LCD/Plasma screen is used, check that the output resolution of the MV-16 is the same as the native resolution of the panel. This will avoid forcing the screen to rescale the image. Most LCD/Plasma screens produce artifacts when their internal scalars are active.

Output resolution is set using the Screen Resolution function under the System menu.

The image is not centered in the screen

Use the monitor controls to align the image.

If an analogue LCD screen is used use the auto-adjust facility.

Unit fails to respond correctly to commands

Power cycle the unit and/or perform a Master Reset. A Master Reset will restore all settings to the factory default. Turn off the power for a few seconds, then turn it back on while pressing both Fade/Function buttons during boot up. Follow any required configuration steps after reset.

Can digital audio be balanced or unbalanced?

Yes.
AES/EBU inputs may be jumper selected per channel to be either balanced or unbalanced inputs. The settings are set via jumpers on each digital audio input card as explained in the installation section.

Can I use analog bargraphs for digital inputs (or digital scales for analog inputs)?

Yes.
The range colors, break points and level references are set for the scale MV-VIP1nd NOT the source assigned.

For example assuming the following settings:

- Analog scale type: AES/EBU
- Analog/Digital scale reference: -18dBfs
- Analog 0dB reference: 0dBu
- Digital upper range point: -18dBfs
- Digital lower range point: -40dBfs

Feeding in analog 0dBu will produce a level of -18dBfs, with the color changes occurring at -40dBfs and -18dBfs.

Changing the Analog 0dB reference to +4dBu will produce a level of -22dBfs, with the color changes unaltered.

Changing the Analog/Digital reference to -20dBfs (with the analog ref still at +4dBu) will produce a level of -24dBfs, with color changes unaltered.

The same applies to displaying digital channels on an analog scale; the color changes will adhere to the analog upper and lower settings.#

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What are the RS232/RS422 options?

RS232 or RS422 operation can be selected via jumpers on the controller (CPU card), as explained in the installation section.

Why are time clock / date settings lost when the frame is power cycled?

This data is normally maintained by a rechargeable battery situated on the CPU board, which has a typical life of 6+ years. Loss of data indicates that the battery requires replacement. Please contact your Snell dealer.

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8. Contact Details

8.1. Contacting our support departments

For details of our **Regional Customer Support Offices** please visit the Snell website and navigate to Support/Customer Support Contacts.

http://www.snellgroup.com

8.1.1. UK Office

The department is staffed from 9.00am to 5.30pm Monday to Friday (excluding UK public holidays)

Outside these times calls will be diverted to voicemail for follow-up, the next working day.

Additional support is available outside these hours by purchasing a support contract details available from the above number during office hours, and via the Account Manager.

Customers with a support contract should call their personalised number, which can be found in their contract, and be ready to provide their contract number and details.

8.2. Copyright and Disclaimer

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